HANDBOOK of MEDICAL TREATMENT

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LOS ALTOS, CALIFORNIA

FOREWORD

Th handbo k M d l T tm t h uld f ll d f th m di l t d t and p tit Wh th dug is bl h d th lini la s fi t th ght f th w lf of hi p t t d t b ing t b th m t ff i th pe t p oc d t th l st p bl m m t H w t t kn w what t d f t d how t th h mi l and th ff t m h d in d t li ympt m and t t th orm l phy i log l b la e m mb g alw y that ympt m i from di t b f m m l phy l gi l m ha sm

This ll cti of ther p ti p d h b w ll re i d by t d t d p itt It h b m a t t b d id mpa f th phy i i th firing l f m di l p a tice

WILLIAM J. KERR
P f s f M di in Em rit

M d l S hool
U i ity f C lif ia
S Fra is C lif ia

PREFACE TO 6th EDITION

Th th ha b g tifi d to b rv th g wi g p p la ty of h i diti f thi Ha db k I th p pa ti f th S th Edit on th y w g i f d w th th p bl m f i wi g t the p ti l t and l t g th dv whi h w f lt t b m t gnific t F thi t w d g wh h ha b th bj t f th i t port p i tial t l ff d w th gua d d mm t th pag Wh th th h f lt that pt m t w it pon tro g id b d pon b d i d this ha b tat d

B t m d l pr g in th p t tw y t ll t m does t i ly f d am ti pha m l gi dis and mport t vi h pt f d g i d t m t imp d und t di g f d g t ty mb natio th py w f ms f t blish d m di d the la i ly m f m in d gn ti d th rape t t hni fi ll th m p po f this Ha dbook d th lt m t j tif f it f q t is

Th drug in thi H db k li t d by th i ff ial Am i d B ti h m C mmon o p pri tary nam gi e i p th wh th on id d h lpf l C d mb f d se re in l d d d t th st d t d hou ff Wh p i d ppe in h de mb th d hould f t St da d N m lat f Di d Ope t on f th Am M di l As ia l

As i p t di io h th d dit s h ve d w f ly po th iti ism of th i ll gue Ou tha ks d pe ially t D P l S na f his p publi i w f th m ipt of h Sixth Edi ti

Milt J Cha ton
Sh ldon M rg
H ry Brai d

S Fra i C lif rnia
June 1958

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Chapter 1

GENERAL ASPECTS OF MEDICAL MANAGEMENT

S f l m d al t e tme t l l d d t on of all the i m u fo ch vi g d m t uning the opt m l phys l a d m t l t t s f th p tent d ng th co f h lln s Th phys m t c n d r the foll wing ge l and p ft m a in f rmul ting a th p ti g m

1 A t v ty tat d b d p t n — P ges 1 and 2
2 E l o me t — P ge 3
3 Cl l b v t o — Page 3
4 L b t ry tudi — P g 6
5 Fluid — P g 5 and 7
6 Sympt m t and pp t m a u — P g 27
7 D et — P g 46
8 Sp if me — S e Spe f D e s

ACTIVITY STATUS

B d e t h long b d w ll t to b a bas t at m nt m thod fo m y illn ss It is h w ot w th t it d a d ant g o it dang

Th d gre e of t ty pe mitt d p ti t h uld be ba ed p c ful o d t on of the p t t s phys log l ds fo a t vity o t I g al t ity sho ld be l th th t wh h te f r w th h l g p s o i d e p to y d t s th d bl sympt m (g e s faligu) On the th h d t ty ho ld t b lim t d to ch n t t th t d dvantageous phy i log l p y holog c l e lt ue

Type f A ti ty St t s

A Amb lat y F all p t nt u l s the spe ific ont a t d t (b low)

B B d R t W th B th oom P vi g s F th p ti nt in wh m f ll ambulat y t tu prod u t w d ff ts

C B d R t W tho t B th m P il g Fo mo t p t t w th nt g d s t f e mod t to m ked dy f om m t ca ses d l al i f tions and i fl mmat o (e g ell l tis phl b t) espe lly of th l w r t mutics

D C mpl t Bed R t Fo pati nt eq r g f c d m f om ply l e t d eli f f om m t al t e Th y m t h l t e t ng c ang g body po t o and g ll b dpan Compl t b d st i recomme d d f pat nts w th e e dy p t myo ard l i fa cti n h mo h g int al t al and me f a t t ber lo

Und. irable Effe ts of B d R st

Even in disease states for whi h bed rest *may be employed* as a therapeutic measure there are dec idedly undesirable consequen es which make consideration of early ambulation necessary

A G.n ral. Asthenia muscle atrophy bone atrophy decubitus ulcers vasomotor instability ano exia flat len e onst pa tion insomnia *hypoc hondriacal trends* phlebothrombosis

B Elderly or Debilitat d Pati nts. O thostat c pneumonia phle bothrombosis with re ultant pulmon ry infarctio uri ary re tention from atonic bladd r or p ostatic ot stru t on foot and toe *deformities (with prolong d rest)*

C Cardia Pat nts. (Espe ially those with nocturnal dysp ea) Increased dyspnea when recumbe t increa ed venous stasis and phlebothrombosis

D Psy h atr Patients. In reased introspection further *fixation on physical inad quacies*

E Rheumatoid Arth it Pat ents. Deformity ankyl sis

Measures fo Redu g Hazards of Compl te Bed Rest

A Limitation of n rcotic and edati e d ugs

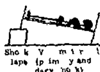
B Deep breathing exer ises to prevent orth static pneumonia

C Good nu sing care emphasizing frequ nt changing of po tion by atte dant maintenance f proper elim nation and rig rous *sk n* care to prevent de bitus ulcers

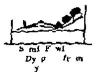
D *I nprov ment of venous* ir ulation by elevation of lower e t em ties and use of passiv b d exer i es

E Foot cradles half hell spli ts support ng pillows and ot e m asu es to pr ent physical deformities (e p 324) *Always have footboard at base of bed*

BED POSITIONS AND INDICATIONS



Sho k V m t r l lapse (p im y and dary ho k)



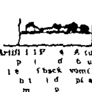
S mi F wl *Dy p fr m y*



F wl r M k d dy p f m any



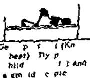
H d (B d El at d l r d i t ni l p s hi s h *pi*



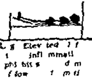
Artifi i l F s A (d l p l d b us l e f back vomi(g h t i d pi at on m p



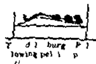
C rdi B d M rk d d p f m y im tj f y h h i)



Ge p f (Kn hest) Dy p hild f l and s gm id c *pic*



L g Elev ted l f i infl mmati phl bit s d m *f low f m ti*



T d l burg F) lowing pel i p *ti*

ENVIRONMENT

A s itable phy ical envi onm nt for a g n illness m t in clud a o d att n of the m ny pers nal eq i ement a d idio- sync ies of th ind idual patient Th following nvi o mental fe tur s h ld lways be cons der d

1 R om temp rat re 4 Lighting 7 Elimin tion
H mid ty 5 Social o ta t of d t and
3 Ve tilation 6 Elimi atio of se all g s

CLINICAL OBSERVATIONS

Con id abl inf m tion of th r peut as well as d gnostic v l may be gleaned f om a ca ef lly maint in d lin c l r ord Su h informat on m y provid v luable d t abo t r sponse to t t me t complic tions and prognos s of the dis se and will h lp in su th g er l comfort of th p t nt Th following b f tini al dat ar incl d d for the nv ni e of th clinician in form lating plan fo foll wing th co se f p tie t Th phy ic an s task is o id bly implif ed if th pati t i in ho pit l whe ad quate ursing f il t es re available Skill d n sing s pervision and c f l nursing notes of p tient s act viti s vit l s gns med a t ons and oth r important dat m ke poss ble mor ff ctive man gement of the p ti nt

Body Temper tur

A M thod of Det min tion and No mal Adult V l s

Ar	A rag T mp	R nge of T mp
R tal	99 6 F (37 5 C)	98 5 99 9 F (37 37 7 C)
V gin l	99 6 F (37 5 C)	98 5 99 9 F (37 37 7 C)
O al	98 6 F (37 0 C)	96 7 99 0 F (36 37 4 C)
A ill y	97 6 F (36 5 C)	

B F

1 Typ

a Remitte t Of d ys or w ks du tio w th lter ating pe iod d ing wh ch t mp r t r is rmal (g bru cello r tert an m la) Temp at hould be t k t i d q i d f prol g d p iod (w ks t month) t d monst t the lter ting f b ile and af b ile per ods

b Int m tte t T mpe tu d ops to m l o subn mal l l o c or mo e in 24 hou (g s pt f er and ea ly tub rc losis) T mp at re must b tak n q i d to d mon t t th variati n within the d y

Ln em tt nt ontin T mpe t e ve ormal du ing 24 h r p od (e g pn umon influen a) Temp t e must be tak q i d or t time e ery 2 3 ho s to d m nst a its ustain d ch r t

2 C s Inf ctio dis e c rt in d ugs f eign p o t ins sp s to exter al he t eoplasti di a e di t ban s of h at r gul ting t r and ne ros s

C Subnormal Temperatures May be due to profus perspir tion hemorrhag shock d creased B M R and mental depression A common cause of recorded subnormal temperature is insuf fici nt time allowed for taking temperature Subnormal temper atur s may indicate failu in a seriously ill patient and demand immediate supportive intervention In such cas s *the physician should be notified at once* Question ble oral temperatures should be che ked by rectal temper tures *During afebrile periods it is often advisable to determine the temperatures by the rectal method*

Pulse

A Chara teri t cs whi h should be noted and recorded include
1 Rat *(normally 60 80 per minute variable) Compa e apical* and periph ral pulses in patients with arrhythmias
2 Rhythm Note regular ty periodicity and missed b ats
3 Int nsity Note f llness of th pulse

B F ctor in asing the pulse rate include card ac rrhythmias f ve card a failure hemorrhage sho k ex rtion emo tional changes o yg n deficit CO_2 exces i creased B M R and certain drugs

C Fa tor de a ing the pul e rat includ athlet c training h a t block increased intra ran al pres re de re sed B M R and jaund

Re pir tion

A Ch a t ristic whi h should b ot d and re ord d in lude
1 Rate (normal rang 14 20 p r minute)
2 Volum and depth e g deep b thi g of Ku sm l type
3 I regularity and p riodi ty e g alt rnati g hype pn and apn a of Ch yne Stokes type

B Fa tor in a ing the rat includ e rc i eas d B M R oxygen def c t CO_2 exc s card c f il e p lmo nary di ase anem a h m rh g fev r CO p ni g drugs ketosi emotional st ss pain n l fa l e and m hani l *inte fe nc* with bre thing

C Factor de reasi g the rate incl de hypnot c and n rcotic d ugs and in a ed intra ranial pressure

Blood P s r

A D t l a d cha t risti s t be noted and cord d includ
1 P tion of p tient t tim of co ding
2 Syst lic level by both palp tory and a s ltato y methods
3 Strength and hara ter of pulsat ons of low r extr mit s in the presence of bra hial hypert nsio

B Phy ological factors which in ase blood p ssure incl d incr a g ag obes ty (if in as is slight to mod rat in obe person this s probably d to elati si of p s s re uff to a m) dig stion e cit m nt rci itting o sta ding po ition (c mp re with blood pres in re umb ncy)

C Pathological fact rs which in ease blood p es include n l d s a be ign and malignant ssential hypert n on in *rea d int a ranial p ssure in re sed B M R adren l* tumors eclamp ia and aortic oa tatio

D P thologi al c s s of hypot sion incl d hem rhag shock d bility a te l vers cardiac fail e decr sed B M R and hyp dren lcorticalism (Addi on diseas)

Int rel tion hips of Vital Signs

A P l T mp r t r R l t hip
1 G n al le F e ry deg e (F) of temperature ri e the pulse r te u ually rises 10 b ts per min te i e 98 60/min 99 70/min
2 Dis ses in which puls rate may be low in p opo tion to fever (elati e b adycardia) Typhoid fe er nd lant fev r infl nz m ingitis inf tious mono ucl osi
3 Dis es in whi h puls rate is u ually high in propo tion to f ver (elati e t chyc rdi) Sca let fev rheumati fe er diphthe ia thyrotoxi osis s b c te ba t ial endocarditis tub cul is terminal or nfavo able pn umonia (pre hock)

B R pi ation T mp at e Relationships
1 G n r l r l R p ato y te ughly p all ls temp r atur cha g
2 Exc ption Intr tho acic o respiratory dise s s (r lative tachypn hyperp e or dyspnea)

C P l Bl d P ess e Relationships
1 Gen al l The sam f to s u ing n incre e in c rdia rate u lly c u e an incr ase in blood pre s
2 E ptio s
a R l ti tachyc rdia Sam s fo p thologi l auses of hyp te sion
b Rel ti e b dyc rd Renal dis as b nign and m lig na t hyperten ion i c eas d int a ani l p es u e

Mis lla o s Ob e tio a d P a ti

Th foll w g obs rvations a also impo t nt in det mining the gene al omf t a d f llowing the linic l st tus of the pati t

A Fl id I t k and Oulp t Co s d ati n of the fl id balan e of the p ti t sh uld in l d th followi g
1 Cli i l al tio of tat of hydr t on
2 E timati n of need f fluids
3 Types of fl id dmini tr tio
(For det ils e Chapter 2 p 7)

B Co d ti of th Skin E id ce f de ubiti (bed or s) heat r sh hyp rhidro s d ug rashes et

C C diti of th Mouth Lips d N r Eviden e of ch fl g ul r t o s de d hyd t tamino is et

Local onditio In th mo th p rmitti g p tie ts hould b ush th i t eth o h e their teeth b ush d with s me imple dent fri e at l t o c daily

Pati nts h uld be giv th opportunity to i se thei m th after ea h m al with plain t p w te physi logical salin ol tion or Alk li e A om ti Sol tio N F (dilut d 2 1)

Ca e m st be taken that th pati t i i an d q te stat of t iti n nd hydratio

D App tit Q ation p ti t reg rding appetit d food d i s
Che k t l f od int k by e amin ti of o tg i g t ay
Det rmin r so s fo r jectio of food A oid prolongati f pal tabi or re tri t d diet f periods i e c s of a tual r q i m t(s ti n on D t p 46)

E Elimination Bed patients are generally prone to constipation This may be exaggerated by the illness itself distaste for b d pans diets and certain drugs When knowledge of elimination is espe ially important gross inspection of all stools passed by tl e patient may be necessary (*see Constipation page 254*) Daily inquiry regarding elimination should be mad of each patient

F Acceptance or Rejection of Medication Always inquire as to rea on for r je tion of m di ation The patient s object ons may constitute v lid *reason for modif cation or cessation of* drug therapy Statements as to untoward reactions from medi cation always d serve careful eval ation

G Sleep and R st The pati nt s statements about amount of sleep or rest may vary considerably from known observations Pro vide suitable envi onment for sle ping and resting by insuring a minimum of interruption by professional s rvices atten dants visitors and ward mates Routine sleep inducing drugs should be avoided (see Insomnia page 38)

H M nt l Re ction of P tient Observe pati it s mood and be havior arefully Wat h for mental depre sion whi h is oft n associated with costly confining s rious or chronic illnesses

LABORATORY AND X RAY STUDIES

O dering Laboratory and X r y St d s

The a eful and at on l o d ing and pe formance of labora tory x ray diagno t c and other sp cial st dies constitutes an essent al ph se of th man gem nt of the patient The blood count urinalysi se ol gical te t for syphilis and p rh ps chest x ray *should be pe formed routi ely* on all hospit l patients

A Special diagnosti stud es may call for car ful planning and integrating with th th rapeutic program and must not conflict w th the treatment schedule

B Impr p rly performed or unn ce sary laborato y and x ray studies aside from the discomfort expense and in onv nienc th y cause the patient may p olong hospitaliz tio

C It must be remembered that ce tain laboratory studie may re quire dehydration (e g Addis test or pyelograms) when it may be lini ally dangerous (e g precipitation of r n l fail re tc)

D Lik wis forced fl ids (e g *P S P*) *may be cont aind cated* in the presen e of n usea or s ve e conge tive f ilur etc

E X ray Plain and dye studi s should p c de all barium con trast studies and retrograde ba ium (nema) st die sho ld pr ced upper g strointestinal studies sin e r rs l of this *sequence of studies* will cause n edless del y

FLUID AND ELECTROLYTE THERAPY AND PARENTERAL FEEDING

FLUID BALANCE

In con id ing fluid th r py it is n ss ry that the p obl m of wat and el trolyte metabol m be on dered indep ndently of e ch oth r The lect olyt s a e intimately on ern d w th the maint nan e of norm l c llular metabolism ac d ba r gul t on and with w ter th maintenance f osmot pr ssure in both th xt ellular and int a ell lar fluid ompartments Wat in ex c of th quantity n e ary for maintaining the isotoni ty f body flu d is r quired for normal bodily function The administ at on of solution of i ot ni el ct olyt s to th patient cannot be onsid r d p oviding availabl wat r f r in th x ret on of th se sam el ctr lyte w ter mu t likewi be ex ret d to ke p th solution (rine) almost i otonic

Daily Oblig tory W te Requir m nts

A ons d bl amount of w t (f f om le trolyt) i n sary f normal bodily function Thes obligat ry wat re qui ments ar r l t d to ene gy xp nditure th y ar giv n in th following table

AVERAGE DAILY WATER NEEDS FOR EXCRETION

M thod of E tion o Los	V lum of W t Ex r t d p r 100 C l i of Food	Volume of W ter Excr t d p D y*
Imp pt ble los (lungs and skin)	44 †	1100 c †
St l	3 5	100
Sw t (p ptibl)	Var w th ext rnal t mpe tu M y be high	0 300 (more at high t mpe tur)
Urin	V w th amount of w ste p odu ts to be ted (e cha t p ge 9)	Aver g minimum 1000 c (if p gr more than 1 020)
Needs fo e et on oth than n		1200 1500
Total (in luding ine)		2200 2500+

Bas d on 2500 Calori food intak

†For g o s l ni al e tim ti th impe ptible los of w t m y be al ulat d as 10 c /Kg (5 /lb) body w ght per day

From the table on the preceding page it is seen that about 1200 1500 cc of water are needed per day in add tion to the amount of water necessary for removal of wastes in the urine

The kidney is the organ which is responsible for regulation of the electrolyte of the extracellular fluid compartment and exc e tion of the end p oducts of metabolism In order to preserve the constancy of th extracellular environment the kidney has the ability *to con entrate the end products of metabolism* Due to this co cen trating ability it is also able to conser e water This ability to con ntrate is limited the urine can be concentrated to a maximum sp cific gravity of approximately 1 032 However the efficiency of the k dney to concentrate falls off rapidly above 1 025 specific gravity In renal disease states when the ability of the kidney to conce t at is lost larger amounts of water m st be take or administ red in order to remove wastes

Clinical Evaluation of State of Hyd ation

A H st y Flu d intake and fluid losses Sudden weight g in and w ight l s es should be noted since they most fr quently ind c te hanges in water b lance

B Physical Examin tion Observe body temperat re kin hydra *tion (t s e t gor) tongue mucous membranes heart rate* and blood pressur

C *Labor tory Te t Observe urine volume and co centr ti n* blood cou ts hem tocrit serum proteins and N P N

D N rsing Not s *weigh patient daily* D tailed i take and *output r cord while patient is under bse vation are extrem ly* valuabl Output hould include not only a record of all mea urable fl d loss s but also notes of obse vations on less ob ous losse su h as incre sed perspir tion and respirat on Keeping these eco ds requires consider ble effort so th nursing staff *should be notified when this inform tion is no* longer need d

E timat on of Ne d fo Fl d

Becau f the nec ssity of administering fluids to cover the oblig to y non renal excretory mechanisms plus suffi ient fl ids to permit excr t on f m t bolic w ste by the kidneys an accurate me sur m nt of the 24 hour urine volume a d sp cific gravity will aid gre tly in d t rmining whether suffi i t fluid i b ing admin istered Approximately 1 5 to 2 0 Gm of urin ry sol ds a e ex cr ted per d y per 100 C lo ie m tabolized This amounts to app o imately 35 50 Gm of sol ds per d y for the average adult More con entrated urin s ge erally remo e proportionat ly gr ater amounts of met bolic wastes although thi el tionship do s not *hold st ictly tru* in d abetes n phritis a d c t in th diseases whi h may alter urine con ntration by the presence of bno m l amounts of certain s bstan s The relationships b tw sp fic gravity volume and urinary solids per 24 hours a e sh wn n th table on the following p ge

---

*2 7 grams of glu ose r 3 9 g ms of alb min *will raise th* specifi gr vity of 1000 cc of urine 0 001 t 15 C

Sp G Urine	Gm Solids pe Lit r	Urine Vol /35 Gm Sol ds (A g Sp Gr)	U ine Vol /50 Gm S lid (Avg Sp G)
1 035 1 030	91 79	400	600
1 030 1 025	79 67	475	685
1 025 1 020	67 55	570	800
1 020 1 015	55 43	715	1000
1 015 1 010	43 31	950	1350
1 010 1 005	31 19	1400	2000

Any sudden and marked chang in the p ent s hydration status during the latt r portion of the collection period will fail t be reflected in the p gr of the total 24 hour specimen

ELECTROLYTE AND ACID BASE BALANCE

No m l conc tr tion f both int acellular and ext a ell lar l tr lytes i n c ssa y f l f Although the int ac ll lar and extr cellula le t olyte a at app ox mately th sam osmot pr ss r th individu l ion a diff ent The el ct olytes pr s e t in th body are grouped into p s tiv ion (tions) and n g tiv i s (anion) Th c t ons re concerned with ll the fun tions of the lect olyt Th ions appa ntly x rt no d e t ph rm o l g ction but a intimat ly invol d w th acid base qu l b um The f llowing tabl g both intr c ll lar and ext ac llular l ctrolyt g ouped s tions and a ion

VALUES OF EXTRACELLULAR AND INTRACELLULAR ELECTROLYTES

	Extr cell la			I t c llular	
Ion	mEq /l ter A g	R g	mg /100 c	mEq /lit r Avg	mg /100
Positive (cations)					
N	142	135 147	310 340	13	30
K^{+}	5	4.6 5.6	18 22	140	550
C^{++}	5	4 5 5 5	*9 11*	*0*	*0*
Mg^{++}	3	1 5 3 0	1 8 3 6	45	54
T tal	155			198	
Neg tive (nions)					
HCO_3	27	25 30	56 65†	10	22†
Cl	103	100 110	350 390	3	10
HPO_4	2	1 8 2 3	3 4	100	400
SO_4	1		4 8	20	96
Org A	6			0	0
Prot in	16			65	
Total	155			198	

Th e pp oxim te l s f m s l
†V l me %

From the previous page t is appare t that the elect olyte patte ns of the intracellular and extra ellular compo ents are e tirely d ff ent Whereas sodium chloride is the main compone t of extracellular fl d potass um phosphate p ssibly *as a prote n* comple is the ma n compon t of intr cellular fluid Th s is of foremost i nportanc in co sideration of therapy (see page 17) espe ial y since only the extracellular components are availabl for cli i al measurem nts

Since l ttle is known r g rding the f nctio s and mod s of gulation of the intracell lar electrolyte con ntratio discuss o of the el trolytes must be co erned primarily with the extra llular elect olytes By a knowledge of the extracellula elect o lyte co cent tion and the m chanisms causing derangement some infe ences an be d awn r gardi g the intrac llular alt rat ons

VOLUME AND ELECTROLYTE CONTENT OF GASTRO INTESTINAL SECRETIONS AND SWEAT

	Avg 24 hr Vol. ml.	Ele trolytes in mEq /L			
		Na^+	K^+	Cl	HCO_3
Extr ellul fluid		145	3	111	?8
Ga t i j e					
Conta ning acid	2500	10 110	1 32	8 155	0
Achlorhydria		8 120	1 30	100	20
B le	500	130 160	2 12	90 120	38
Panc ati ju ce	700	110 150	2 8	50 95	70 110
Small bowel s ction	100 6000	80 150	2 8	40 135	30
Ileostomy					
R cent	*100 4000*	*100 150*	5 30	90 140	30
Adapted	100 500	50	3	20	15 30
Ce ostomy	100 3000	50	8	40	15
F ces (fo med)	100	<10	<10	<15	<15
Sw at	500 10 000	0 100	0 5	0 100	0

Minor alteratio s of io conce tration occ r i int r titial fluid in re pons to physical laws governing the production of an ult a filtrat of pla ma

Mod f ed f om Lo kwood a d R dall B ll N Y A ad M d 25 228 1949 a reprint d in Kr pp et al Physi ian Ha dbook 10th ed 1958 *Lang M di al P bli ation* Los Altos Calif

FUNCTIONS OF THE ELECTROLYTES

The electrolytes of the tra ell la flu d serve th ee pr cipal f n ti s (1) r gulation of o motic p es r a d water bal e (2) maint a c of o m l ne romus la f ct s a d (3) id b s r g lati

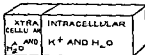
REGULATION OF OSMOTIC PRESSURE AND WATER BALANCE

Th o moti p es r of both the int a il la a d xtracellula ompon t of th body ar at all tim s qu l In health the osmot p es e is quivale t to ab ut 310 millio mole per l t r The t t l body water is qu l to about 40 65% of th body weight w th an a e g of 55% fo mal s and 47% for f mal Th val s are lowe in obe ind idual higher in lean m cula individ al About 15 17% f the body weight is in the xt c llular flu d com p rtment and abo t 1/3 of this is int vascular A ment o d abo e the onic ompo ition of the ext a ell l r and intr llul fl d i e t ely diffe nt a d this diffe n i maintai ed by intra ll lar en ym sy tem wh ch r m u want d l t lyte (g od um) rap dly as it d ff s into the cell *Shift of water between the two compartments is the principal means of maintaining osmotic equilibrium whenever there are alterations in electrolyte or water concentr tion in the body* Th ignif cant alt r t o s that on count r clini ally r illu t ted b low Th e diagrams r over impl f d and f il to show the el ctr lyte hifts th t oc u in patholog cal ond tions lin al st t s g ally te d t b comple p bl ms f th s the the simpl si gl nt tie

FLUID COMPARTMENTS

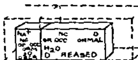
N m l

Thi figu ep se ts tot l body w t with th n rm l e t a llul int a ll l r fl id and l t olyt *conc ntrations*



Simpl D hyd t on W thout S lt Los

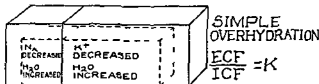
In this o d tion th l t lyt are conc t ated th xt a ll l r int ll la fl d tio i th m f r a n m l



A Common Clin cal Cond t on Lack of water gastric vomiting
B D agnostic Poi ts Mark d thirst (probably a symptom of intra cellular dehydration) poor tissue turgor high urine pecific gravity high hematocrit all extracellul r electrolytes may be ele ated but proportions n rmal
C Treatment Administer fl d without electrolytes Water orally 5 10% glucose n water I V

Simple Overhydrat on

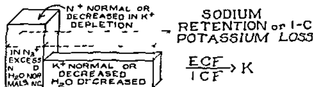
In th s condit on the electrolytes are dilut d the extra llular intracellular fluid ratio is the same as for normal



A Common Cl ni al Co d t Excessive fl id intake w thout salt Excessive electrolyte free fluid administration to patient w th oliguria or anuria Exce sive posterior pitu tary antidiureti hormone (ADH) produ tio
B Diagnostic Po ts Edema low urine sp g if patie t is ina t ng e c pt when due to p t it y ant di r tic hormone (ADH) elaboration (in which cas low urine o tput with h gh sp gr) low Hct all extracell lar electrolytes duced but p oporti ns normal BP no mal or el vated Convuls o s if e trem
C *Tre tm t Usu lly w thh ld ng of flu d and l ctrolyte*

Ex ess S dium Retenti n o Intr ll l K^+ Lo s

This leads to excess fl d n the extra llul r compa tm t with depletio (d hydrati n) of the ntra ll lar fl d

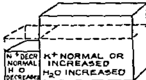


A C mmon Cl ni al Cond t o s Card a fail li er failu with a cites n l di ea w th f ilure to ex rete sod um essi sod m ntake adm ni trati of me te o d hor mo s or ACTH a d d bil tati g di ease with t dequ te K^+ int ke
B D gn sti P i t
1 I Na^+ t t on Ed m patie t may be thi ty low h mat oc it el vated BP e trac llular od um co e t t on m y be no m l or elevated u ine spe ific g a ty ally l w
2 In K^+ depletio Edema may b p se t se m Na^+ may b normal b t s ofte de eased with se re depl tio of i tracell lar K^+ L w *Na may be d e to int acellular* N^+ tran fe o e tr ellula o e hyd atio (s afo)

C T atm t
1 If d to ex s N^+ R t icti n of dieta y od um or admı istration of age its to nd ce s di m l s by kid y g d git l s me cu als ac ta olamid (D amox[®]) hlorothiaz de (D u 1[®]) te W t r ally 5 10# glu ın w t I V (to p ovid el ctrolyte free wat)
2 If d e t K^+ d pl tion La g qua tit of K^+ to or ct int a ellul d f cit

Exc s i Na^+ Lo s (Low Sod m Syndr m)

Th l d t d min h d xtr c liul fluid and an inc as of int c llula fl id



A C mmon Cli ic l Cond ti Low sodium i tak x s use f m cu ıal d et s e s flu d int k w thout sod um aft r p olong d sw ating Add son s dis s sod um binding resın the py od um loss with g troınt tinal flu d l s
B D gn sti Poi t Low blood pr sur muscle cr np low r ol m t t m s of l w sp if gr v ty b f th st
C T tm t Adm n str t o f od um s lts in c n nt t ons gr te than ı oton (e p g 17)

MAINTENANCE OF NORMAL NEUROMUSCULAR FUNCTIONS
(Neuromuscular Irritability)

Th l t lyt onte t of th body kept m k bly con tant h fly by th k d y s l t v b l ty t xc et o cons ve ınd vid l i The l v ls and balan of th v ou p s t v ion (t on) ar mp tant n n intaining no mal n u om s ular irr t b l ty and th y v y l ttl in health Wide ı t ons ar ın om p tible w th life and symptom ar s when ex es e or d f en s occur

I t el ti sh p of El t olyte and N on l Funct

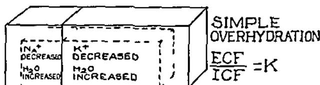
Th e t l t on h ps b tw n extr llul ion on t t on and n ur mu cul fun tion not i r Many f th s gn and ymptom f d fic i s and e e s s f iona m y b d to alte t on ın int a llul tent which m y o m y ot be d t t bl by th m a ur m t of ext llular el t lytes and fl d lon

A V i t on i Eff ct of H rmon An x ell t ampl of thı i found in th ff t of two h mon s upon s rum potass um l ls am ly d oxy rti t one and test sterone Both of the ho mo can low r th s um potas ium m kedly Howeve symptoms of pot um d fic y ne r de elop w th t stost on It is beli ved th t this be use th hormo e us an int ac llul r mov m nt of pot sium and t t on f pot si m by th body Desoxyco tic t on h w u

A <u>C mmon Cl n al Co d t on</u> Lack of water gastric vom ting
B <u>Di gnostic Po nts</u> Marked thirst (probably a symptom of intra cellular dehydration) poo tissue turgor high urine specifi gravity high hematocrit all extracellular electrolytes may be elevated but proportions normal
C <u>Tr tment</u> Administ r fluid without electrolytes Water orally 5 10% glucose in water I V

<u>Simple Ov rhydrat</u>

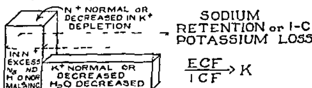
In thi ondit on the electrolytes a e diluted the extracellul r intracellular flu d ratio is the same s for normal



A <u>Commo Clini l Co d t ons</u> Excessive fluid int ke without salt Excessive ele trolyte free fluid administration to a pat nt with oliguria or anuria Ex essive posterior pituita y *antid uretic h mone (ADH) product on*
B <u>Diagno t c Po nts</u> Ed ma low u ine sp g if pat e t is rina ting xcept wh n d e to p tu tary ntid eti ho mone (ADH) elabor t on (in which ase low urine output with high sp gr) low H t all xtracell lar elect olytes reduced but proport ons no mal BP normal o elevated Convulsio if extreme
C <u>Tr tment</u> Usually w thholdi g of fl id and electr lytes

<u>Ex s Sod um R t ntion or I tr ll l r K^+ Lo</u>

Th s lead to excess fl d in the xt acell l compa tment with depl t on (dehyd ation) of the i tra llul fluid



A <u>Comm Clin l C nd t o s</u> Card ac fail e l ver failur with a tes en l dis as with fa lur to xcrete odi m x es iv sodi m i t ke admi i t at n of ome ste oid ho mo s or ACTH a d d bil t t g d e s s w tho t ad q at K^+ int ke
B <u>Diagn t c P i t</u>
1 I N^+ t tion Ed ma pat nt may b thi ty I w hem t oc t el v t d BP e tr cell l sod m e t tio m y be o m l o le at d uri pecific g a ty u ually low
2 I K^+ deplet on Ed ma m y be p se t s um Na may be ormal b t s oft n decre ed with s ver d pletio of i tracellular K^+ Low N may be d e to i tr c llula Na^+ t ansf r r ext ac ll lar overhydration (abo)

D Respirat ry c dosi ind c d by high on nt ati ns of CO_2 i i p ed air leads to c e seed h ght f R and T wa s el va t n of $ST_{1\ 2}$ d pr sio of ST_3 and t tim s in e on of T_1 o T_3 or both

Act of An (Neg t e I s)

Th gati on o cerned almost e t ely with osmot c equ lib i m and pH cha tg s xc pt for the serum i rg c pho ph rus The pho phorus app rs to b n ded for prope utiliz t o (i ph sphorylat o) of glu o e d pos bly fatty a ds a d so deq ate qu titi s m y b mp rtant i add tio to I V gl co e whe the l tt s i d t d

ACID BASE REGULATION

A d Bas Equ lib ium

Th pH of th xtr ellular fl id during lif is m i ta ed t 7 0 to 7 8 (av ag 7 35 to 7 45) A pH b y nd thi range i in c mp t bl w th lif The regul t f the pH within e ch narrow l m ts is th funct n f th buff sy t ms f th body p in ip lly th bic b te buffe At a pH of 7 4 (under no mal cir um stan e) th s buffe syst m s c mp s d of 1 35 mEq /L of phy ally diss lv d CO_2 H_2CO_3 d H^+HCO_3 and 7 0 mEq /L of B(ba e)HCO_3 whi h gi es r tio of 1 20 CO_2 $BHCO_3$ Th el tion h p betwe the phy i ally dissolved CO_2 and the H_2CO_3 is exp s d a f ll w $CO + HO \rightleftharpoons H_2CO_3$ The on ntr ti f th d s l ed CO_2 abo t 1000 times s g eat th H_2CO_3 Th $H\ CO_3$ d ss t s to $H^+ + HCO_3$ to yield the hydrog n ions fo th buff yst m Si th phys cally d ss l d CO_2 is di e tly r lat d to th partial p e s e of th gas n t ct with th l q id t b c m l th t the d s ol d CO rte l blo d nd h c th hyd g n io o e t at is d ectly elat d to l l CO_2 n ent t (lve la pCO) The int r l t ships an b r p s t d as foll w

$$pCO_2 \cong \frac{CO_2 \rightleftharpoons H^+\ HCO_3}{B + HCO_3} = \frac{1\ 35\ mEq\ /L}{27\ 0\ mEq\ /L} = \frac{1}{20} = pH\ 7\ 4$$

Th r t f $^1/_{20}$ k p th pH t 7 4 rega dl s of th ab olut quant ti of H_2CO_3 and $BHCO_3$ pr s t In any probl m inv lving a disturbanc of a d b s q ilib i m a m h bette s lution can be btain d th efo by knowi g (1) the pH (2) the pCO_2 and (3) th HCO_3 of the t l blo d The us l m of obt i ng thi nfo m t n t det mi th pH d tot l CO_2 ont nt of an ero bi lly ll t d and handl d art r l blood Knowing th s two lue th pCO_2 d HCO_3 an be alc l t d ing th followi g equ tio s (Tot l CO_2 and HCO_3 n mM/lit pCO_2 in mm Hg)

( ) To d t rmin pCO_2

$$pH\ \ 6\ 10 + \log\ \frac{(\text{Total } CO_2) - 0\ 0301\ pCO}{0\ 0301\ pCO_2}$$

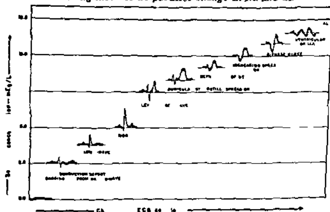
(b) HCO_3 $(Tot\ l\ CO_2) - 0\ 0301\ pCO_2$

marked urinary loss of potassium with intra and extracellular depletion and may lead to symptoms of potassium deficiency

B Effect of pH on Electrolytes The pH of the blood is impo tant in determining this intracellular extra llular shift of ions This is most noticeable in the cas of sodium and potassium In acidosis potassium leaves the c lls and tends to be retained by the kidney leading to high extracellular potassium sodium may tend to migrat irtracellularly du ing this phase In alka losis the reverse occurs potassium moves intracellularly with hyd ogen ion while sodium moves extracellularly gg avating the extracellular alkalosis These cha ges e shown on p 16

CORRELATION OF THE SERUM POTASSIUM CONCENTRATION AND THE ELECTROCARDIOGRAM

Providing there is no parallel change in Na and Ca



(From K pp Sweet Jawetz and Armstrong Physici s Ha d book 10th ed 1958 Lange Medical Publi ati ns Los Altos Calif)

Eff ct of El ct olyt s on Ele troc diogr m

In dd tio to me r m nt of se um con ent ation al n the Ecg may be of v lue in diagnosis of ion ab o malities specially alterat ons oc ur ing during th rapy B c s of the compl x i nic interrelationship that occur m ny p tt rns ported a e of quest onabl spe ificity The m st important a e those for Ca^{++} and K^{+}

A Ca^{++} C l ium d ficiency p ol gs the ST a d h nc the Q T nt rv l excess shorten th ST and he e the Q T i t rval The quantitat on of these chang s h s not b en w ked out

B K^{+} Th pot asium chang s a e b st ill t ated by th abov di g am Th re appe r to be an interrelation hip between Ca^{++} and K^{+} both li ic lly in t rms of symptoms and E g effects the r symptoms and Ecg ffects are ant gonisti and a deficiency of one may canc l out a defici ncy of the other

C Mg^{++} and N^{++} No pecific E g hanges have been desc b d for n gn s n or sod um ion change how ver th effects of sodium appe r to antago ize those of pota sium

Adm n ster half the amount m the f r t 12 24 h urs th rema nde in th n xt 24 48 ho rs Giv a salt by mouth or hype to c solution I V

B In the c s of th rem nd r of the o sal in tial replace m t can be m de e peci ily whe pare teral admin stration i contemplat d *by estimation of the deficiency in extracellular fluid* Thi type of calculation s obv ously in or t in th ca e of K^+ in e this io l la gely intra ellular a d def cit may b v y l rge *but the arount calculated* can be gi n quite rapidly without da g rous e tr cellul con centratio s being produc d Special precautio s ar n essary i sul j ts w th re al i sufficien y Rapid admin stration m y esult in hyp rkalemia In the cas of HCO_3 replacement it als fail to take int ac ount the intra ell lar HCO_3 F of cal lat n thus form la as umes an xtracellul r fl id on t t equal to 1/5 of the b dy weight This e timate is not exact specially in ase of distu bed fl id a d lect olyte b la e

$$\text{Am unt ion n d d (in mEq)} = \frac{\text{Patient s wt (in Kg)}}{5} \times \left[\text{Norm l value of ion (in mEq /L)} - \text{P tient s l vel ion (in mEq /L)}\right]$$

E mple 100 Kg man h s s rum CO_2 content of 15 mEq /L. How m h sodium lactate is need d to bri g serum CO_2 to n mal?

mEq of CO_2 $\frac{100}{5} \times (27\ 15)$ 20×12 240 mEq

Th fo e 240 mEq of odium la tate is ne d d by the pat

Milliequivalent Conversion Fact s fo Conve sion of Blood Chemist y Findings

To d t rm n mEq /L f	Divid mg % vol % by
Cal um	2 0
Chlo id (from Cl)	3 5
(f o N Cl)	5 85
CO_2 C mbining Power	44
M gn ium	1 2
Phosphoru mM (millim l s)	3 1
Pot s im	3 9
Sod um	

I.V FLUIDS AVAILABLE FOR ELECTROLYTE

Many fl ids t m t va ious th rap u vi d and a comm r ially obt inable list of the olut ons vailable b ed on isotoni ity and influ on th acid b abl on ent t s to be dd d to oth r y the lect olyte l tio s are us d t l ast half i toni and p eferably hype to i wh being gi n I V I toni w t o *solutions of el ctrolyt c t in* f an ons d tions r i t r

mEq /L	N m l	R pi to y A do i		d Alk l sis		M t b li A d i		a d Alk lo i	
		A id i	C mp n t	Alkal	C mp t o	A d	C mp i	Alk l	C mp to
H HCO3	1 35	> 1 35	> 1 35	< 1 35	< 1 35	1 35	< 1 35	1 35	> 1 35
1 35 — 0 5 10 15 20 25 30 35 40									
B HCO3	27 0	27 0	> 27 0	27 0	< 27 0	< 27 0	< 27 0	> 27 0	> 27 0
S rum pCO2		I d	I d	De d	De d		De d		I d
R	1/20	1/20	1/20	> 1/20	1/20	< 1/20	1/20	> 1/20	1/20
pH	7 4	< 7 35	7 4	> 7 45	7 4	< 7.35	7 4	> 7 45	7 4
Mech i m		A d l i d e t t ti f CO_2 ulti g f m im p ope til ti C mpe ti oc with vi g f fi d b by l y th i f NH_4		Alk l i d e t c l e blow g ff f CO_2 C mp ti oc r by l tl f f d b		A id i ult f m l f fi d b d/or a m l ion of o g i fi d id C mpe t cu by th bl wing off of CO_2 if re pl t y m h i m is m l		D ally t K^+ lo l s of a id ra ly lkali i g tio C mpen tio u by CO_2 et nti	
Di C		Any d int f g w h p p sp t pn moni mphy em con g tive f l sthm poo ly f ti i g p t		Hyp til ti l i y p y hologi al ru e f p ida (g pi)		R l lo (f l e) d b li id ls l s of b f m GI tract th s		U ina y K^+ los w tho t pla ment gast i miti g ra ely lkal ing ti	
re tm t		T t und rly g d a d tt mpt t imp tilati n B i ly u d C e tion w il re lt wh di l i c t d d CO_2 i bl w ff		H ld b ath b a h i lo p p b g b the 5% CO_2 O_2 t p ppli C on will oc fi d ba will t t m l by b dy t ti f b e		R m i d pl fi d b e by th f fl id a d l t lyt (if dims i hed) C tio f H HCO_3 lt from pl at y r t i f CO_2		Repl K^+ d fi t (l g d s of K ft n e a y) d any N d fi it i d t d by ing Cl lt M y NH_4Cl b t with t	

Admin st r half the amount in t first 12 24 hours the emainder in the ne t 4 48 hours G ve as salt by mouth or hypertonic solutio I V

B I the ase of the ma nd r of the ion sale t a re ace me t can b made especially w en paren ral admin s ra ion is cont mpl t d by estimati n o the de e L e trace llular fluid This type of c lculation is obvious y mo co r ct in the c s of K^+ since this ion is large y in t a lula a d def c is may be ve y large but t e cross e l g c b given quite rap d y without dang rous extracellular con c ntratio s b ing produ ed Special p e a tions are necessary in s bje t with r nal insufficiency Rapid adminis ra ion may re ult in hype ka emia In the c se of HCO_3 replacement it also fails to tak into account the intrace lular HCO_3 F r eas of calculati n this formula assumes an extracellular fluid content qual 1/5 of the body w ight. This e timate is er eas sp ially in a s of disturbed fluid a d electro yt balance

$$\text{Amount on n ded (in mEq)} = \frac{\text{Pat e t s wt (in Kg)}}{5} \times \left[\text{Normal value of ion (in mEq/L)} - \text{Patient s level of ion (in mEq/L)}\right]$$

Ex mple 100 Kg man has serum CO_2 content of 15 mEq/L. H w much sodium lact te is needed to bring a rum CO_2 to normal?

$$\text{mEq of } CO_2 = \frac{100}{5} \times (27 - 15) = 20 \times 12 = 240 \text{ mEq}$$

Th ref re 240 mEq of odium lactate is needed by the patient.

Milliequivalent Conversion Factors for Con ersion of Blood Chemistry Findings

T d termine mEq/L of	Divide mg % or vol % by
Calc um	2 0
Chl d s (f om Cl)	3 5
(f om N Cl)	5 85
CO_2 Combining Pow r	2 22
Magnesium	1 2
Ph ph rus mM (millimol)	3 1
Potas um	3 9
Sod um	2.3

IV FLUIDS AVAILABLE FOR CORRECTING ELECTROLYTE DISTURBANCES

Many fluid t m t arious therapeutic needs have been de vis d and commercially obtainable The following is a partia l t of th l tions a ilable bas d on their electr lyte c ntent sation it and infu e on t e id bas balance Some are avai e concent ate t be added to other fluid When these or ny oth lect olyt solutio s a used be certain the f nal fluid is t l as hal isotonic and prefe ably isoto ic It may even be hype to ic when being gi n I V Isotonic sol tions are 5% glucose wat r a l tion of el ctrolyt s contai ing about 150 mEq each f anions and tion pe lit r

Neutr l Sol tions Containing Potassi m

See page 25 for precautio s with potassium administration

Uses For potassium repl cement

A D l te Potassium Solut s (G ve in 5% glucose solution)
Two different concentrat ons are given below

Constituent	% Sol	Gm per liter	mEq /l ter f o s K⁺	Cl
KCl	0 186	1 86	25	25
KCl	0 3	3 0	40	40

B Co centrates (To be added to half isoton or more conc n trated solutions only) *Never administer directly from ampule*

1 Concentrate KCl 20 mEq e ch of K^+ and Cl in 10 cc of *solution (1 5 Gm KCl/10 cc)*

2 Concent ate potassium phosphate The addition of potas um phosphate to glucose solutions has been suggested to enhance carbohydr te utilization when indicated (g diabetic a do sis) Th s may be best prepared by addi g the conce trate to 5% glucose solution the pH of the mixture given is su t able for I V use 20 cc ampules contain 60 mEq K^+ and 32 mM PO_4 per 10 cc

3 Potassium a tate (Quadrate®) alk lin yielding but us d only for K^+ ffect 4 mEq /cc in 30 cc ampules

Neutral Solutions of Mixed Electrolytes

Us To upply oth r c tion besides N^+ and K^+ Th ir pla e in clinical practice is still not clearly defin d b t since losses of electrolytes are rarely s ngle combin tion repla m t may be warranted

A Ri g r a l j ction U S P , C mpound I ject on of Sodi m Chloride B P (isotonic)

Constit ents	% Sol	Gm p r liter	mEq /l ter of o Na⁺	K	Ca⁺⁺	Cl
N Cl	0 86	8 6	145			145
KCl	0 03	0 3		4		4
C Cl_2	0 033	0 33			6	6
Total			145	4	6	155

B *Con entrate of Potassium Magnesi m C lcium* (KMC®) (To b added to half oto or m co ent ated fl ds) Co tains 25 mEq K^+ 10 mEq Ca^{++} 10 mEq Mg^{++} 45 mEq Cl /10 c ampul or

KCl 1 8 *Gm*
$MgCl_2$ 48 Gm
$CaCl_2$ 55 Gm
} in 10

S lutions of Mixed El ct olyte Yi lding Fr e B

Us , U d whe b se and pota sium pl ement i r quir d simultaneously

A Low P t s m L w F B e L ct t d Ring s S l ti n U S P Compound Inj ct on of S d m La t te B P (H rtmann s) (i t n c)

Constitu t	% S 1	Gm p 1 t	mEq /l t	of on		
			N +	K+	C +	Cl
N Cl	0 6	6.0	102			102
KCl	0 03	0 3		4		4
C Cl	0.02	0 2			3 5	3.5
Sod l t t	0 3	3 0	27			
Total			129	4	3.5	109 5
Fre N +			27			

B High Pota m H gh F B Lactat d P t s S lin I jecti U S P (D ow s luti) (FNL) (is tonic)

Co titu t	% S 1	Gm p 1 t	mEq /l t r	f i		
			N +	K+	Cl	La tat
N Cl	0 4	4 0	70		70	
N l t t	0 6	6 0	53			53
KCl	0 27	2 7		35	35	
Tot l			123	35	105	53
F e N			53			

C V i int m diat sol t on contai ing les K^+ and l f e ba r ls av ilabl [g G t El ct olyte S l t on W th 10% De t s (B xter)] isot ni

Co tit ent	% Sol	Gm p 1 t	mEq /l t	f on		
			N +	K+	Cl	Lactate*
N Cl	0 51	5 1	88		88	
KCl	0 09	9		12	12	
Sod l t t	0 56	5 6	50			50
D xt s	(10)	(100)				
Total			138	12	100	50
F e N +			50			

S l t o f Mi d El t lyt s Yi ld g F A id [G st ic El trolyte Sol t W th 10% D t o (B te) i ot] U T r pl c ssi Cl l s plus f q nt mall r losse of Na^+ and K^+

Co t t nt	% S 1	Gm p 1 t	mEq /lit	f ons		
			Na^+	F +	NH_4^+†	Cl
N Cl	0 37	3 7	63			63
KCl	0 13	1 3		17		17
NH_4Cl	0.37	3.7			70	70
D t	(10)	(100)				
T t 1			63	17	70	150
F Cl						70

Sod um l t t s q l t to f e b
†Amm nium hl id t q i l tt f e acid

So called Balanc d Elect olyte Solutions

Recently s ver l manuf cturers have b en d str buting so called balanced electrolyte solutions for m intenance therapy They closely simulate the electrolyte content of pl sma except for slight ly higher potassium Their value is q estion ble however beca se body losses of electrolytes do not follow the patt n of serum con centrat o In the pr s nce of good renal function it is doubtful that the added base or electrolyt s are essential They ha e no value as corrective agents and may b harmful in som d se se states (e g metabolic alkalosis)

ROUTES OF ADMINISTRATION FOR ELECTROLYTES

I V Administrati

It is most important to e e cise gr at car n admin stration of I V solutions since these alt r extracellular flu d co c ntrat ons rap dly This is especially true when giv ng K^+ and Mg^+ salts which are exceedingly tox

In the p esence of normal renal and respi to y mech nisms when swallowing is poss ble the oral administration of salts is p efe red

Oral Admi i trati n

Whe oral salts a administ r d us ally the negati e ions are not too important See pag 20 for the commonly used salts

PARENTERAL FEEDING AND FLUIDS

When oral f ed ng are impractical the par t ral rout s are th methods of choic

HYPODERMOCLYSIS

Hypoderm clysis i th s bc tan o dm n t at on of large quant ties of sotonic solut ns usually phys ologi al line or dex tro in water o salin Administer at ate of 250 500 (1/2 1 pt) p r hour by use of 1 needle or 500 1000 (1/2 1 qt) p ho with 2 ne dles Usual practic 1 m x mum is 3000 4000 c (3 4 qt) per day Care must be taken to void o erdistending th t ss This an c use avascularity which m y lead to t ss n ro i When g ing glucose solutions 2½% in h lf normal saline i p eferred 5% may be given in water but not to d bilitated elderly patients *Never give glucose in concentrations over 5% to any patient*

To facil tate abso ption hyal ro id se may be s d 250 vis co ty units are us d per 500 1000 cc of fluid The m t ial m y be injected into the tubing of th hypode mocly t into the sit of insertion of the needl s o may be dissol d in th e i tion The rate of fl id absorpt on s in e ed up to about 12 tim

VENOCLYSIS

The intra enous th out of h e fo e tra alim t y ad mı t ti of fluid and nutri nts Fl d l t olyte carbohy drat s prot s d itamin can be dmın st d by thı m thod The following r th n m l r qui eme ts

W t r
Th o ly w y w t n be give I V with t l t lyte to pply the obligatory n d f th body is as sol t f 5% o 10% gl s a d/ f t e in dist ll d w t NEVER adm n st r pl in d t ll d w t I V P t in hyd oly tes may t ın ign ficant q ant t es of lectrolyt s (NaCl lly) and the nd pr d t gi t a

El t olyt (Mıner ls)

A Sod m S d um hlor d (NaCl) ıs th most important el t o lyte Averag d ıly nt k 3 to 5 Gm (45 75 gr) A r g d ly q m nt 500 1000 c (1 pt 1 qt) f phy ol gical (0 85 0 90%) salın If onditions l ading t e c ssi NaCl loss p nt dded s lt may b gi en Oth wi do not give ver l lit (l qt) physi logical lın (8 5 9 0 Gm) d ıly

B Potass m If p e teral th py i to b contın ed for ov 3 t 5 d ys one should pply mor omplete l t lyt re placem t pe i lly pota um l es Av ge d ily b l p t lum r quir m nt is bo t 2 to 4 Gm of KCl (25 50 mEq of potas um) Th s m y be d e by us f oluti s c t ıning potass m by adding p t ss m hlo ide to alı e or glu e (p ge 2) *Potassium solutions must be administered slowly (25 mEq /liter of F^{+} in 2-3 hours) Never administer pot ssium I V in the pres nce of poor renal function*

Glu os a d Other Sug
May g 5% or 10% s l t on Pr f bly administ d in d till d water but m y be g in lın N v g v mo e r p dly than 0 8 Gm p r Kg (1 dr /10 lb) p h ur this i max mum at of ut l at Wh given mo p dly than th gly osurıa and o m tant fl d los u u lly sult In s whe lo c n ed s gr t and fluid rest ti n is n s y mo onc t t d gl ose (20 50%) m y b giv I V ve y l wly

Eq al p t gl os and fr ct e (inv t ga) h v e ently be h w t b t ll ed s mewh t m e rapidly than gl and can b dmıni tered m e r pidly Th differ nc h wever not m ked Fru to alon has b n ad oc t d espe ally n dıab t b t it pl l un taın

P t

A Am o A d U ually gı P t i Hyd lys t (I t a v o s) N N D s d ually administ d s 5 5% s l t on (ually in 5% gl e i dı till d w t) H ghe c t a tio f p t n m y be ed b t th l t n is th oft t o thi k o i itat g S l tio m t be adm ni t d slowly ab t i lit (l qt) in 2 ho M t m t al e now low i l trolytes (pe i lly N^{+}) b t h b d hould b h k d if th i impo t t

Amino acids sho ld not be g v n whe protein itself would be co traindi ated (e g anuri)

B C trated Normal Huma Plasma U S F has about 7% protein it is an exc llent sou e of protein Plasma contains sodium chloride in the same concentration as physiological sali e so limit usually is 1 liter (1 qt) per day The pr ncipal dis ad antages of plasma are the d nger of producing homologous serum jaundice (even if treated by ltraviolet irradiation) the high cost of the *material and pos ible citrate intoxication* with large doses

C Normal Human Serum Albumin U S P or Salt poor Serum Albumin An excellent sour of protein 25 Gm albumin per 100 cc sol tion is quivalent in osmotic pressure to 500 c of plasma This is an ex llent way to administ r protein in a small fluid volume and with low salt intake by giving the salt poor material Albumin is very expensive

Fat

Fat emulsions for intravenous se have been the object of in vestigation and e perimentatio for some time Such a p eparation wo ld seem to constitute an xcell nt m ans of maintai ing nutrition if a a lable although its nutritional value as compared w th or l ingestion is not entirely cle r Th main problem app ars to b that no preparation has yet bee offered wh ch is consist ntly free of reactions usually e ere pyrogenic ones The mulsions tend to break down especi lly w th fr zi g or extrem temperatu e cha ges

Vitamins

In prolonged par ter l nutrition o e of the more mplete B p epar tions plus vitamin C and pare teral K hould be admin s tered I V r I M

Gener l Inad qua y of Intravenous Alim ntation

As oon s pra tic l o al f eding hould be started It s usu lly impossible to administ r ad quat c lo s by int avenous *means* The *following* hs t outlin the *gener* l pr ctical daily physiological l mit of intrav ous alim nt tion Th principal limiting factor is the fl id intake Th admin strat on of 3000 cc of 5% protein hydrolysat in 5% gluco sol tion would giv th follow ing amou ts f flu d ele trolyte and nutri nt m t r al

Fluid	Min ral (as NaCl)	Gluco e	Frot in Hyd olys te	C lories
3000 cc	Up to 6 0 Gm	150 Gm	150 Gm	1200

Each 50 Gm of prot in hydr lys te m y ont in up to 2 G n of NaCl, although most products now contain les N *

Chapter 3

GENERAL SYMPTOMATIC TREATMENT

TREATMENT OF CONSTITUTIONAL SYMPTOMS

PYREXIA (Fever) (code No 003)

Me s s specif lly d r ct d toward dep ion of n elev ted body temperatu e per e e u ually n t ind ted ex ept fo high d p ol nged f v s

A <u>R moval of th Sp c f C s of th F ve</u>
  1 Inf tion S ind f r p if d es
  2 D g or ch micals Ma y drugs (g s lfonamid) are pabl of indu ing f b ile r tions
  3 D hydr t on P ov de ad quat oral o p r nt ral fluid
  4 Imp rm nt of C N S h t gulating c nt r Thi pos difficult th rape ti probl m P ovid for optimal oxyg na ti n and hyd atı f t ues nd p vent xces e hyp the mia by a tif cial meas r if indicat d (s below)

B <u>R duction of the F v r by No spe if c M s</u> Wh n the body t mpe atu e gr at than 40° C (104° F) pa ti ularly if prol ged th foll w g measu es may be ut lized
  1 In reas d fluid int ke By o al o pa nte al rout s
  2 Wa m lcoh l sponges Cooling i d e to evaporation
  3 Wa m o t p d baths Th e ca e pe iphe al vasodilatatı n
  4 C ld spong s P id prompt co li g of kin a d psy ho logi l rel ef b t int rfe with h t los
  5 I b gs P ovide loc l omf rt e g fo h da h
  6 Antipyr ti dr g Th s d ugs e q t eff tiv re d i g fe er and h e a simultaneo s analg i ffect They have th dis dva t ge that th y ob re the clini l pi tu nd m y cau e undesi bl sid ffects s ch a d apho i skin er ption h m tologic ha g na s a d vomiting cardiovascular dep ion et Such d g the fo e e to b employ d ca tio ly in infectı s f s and p ef r bly t u d in the t r f v (e g typh d f ver) A tyls licylic a d (pır) sodi m licyl te o c to phe t din (ph et n) 0 3 0 6 Gm (5 10 g) ev ry 4 h p n a amo g the m st omm nly u ed and r prob bly l ast pt to p od ce tow rd ction

SHOCK (Circulatory Failure or Collapse) (code No 0x8)

Shock is a ompl x and as y t i ompl t ly und tood lini l yndr me of p iph l ci ulato y f ilur Numerou p thophysi logic l me hani ms a in olv d i the p od ti n of shock su h la k f ffectiv blood v lum alt rat on f diac outp t l s of pe iph l v cular to in eas d pill y p rme bility failu

of blood oxygenation mechanisms and alterat on of the physicoch m ical characteristics of the blood Two principal types of shock must be differentiated clinically

A <u>Primary Shock (Immediate Shock Fainting o Collapse)</u> This form of shock consists of transitory insuff cien y of ir culation and follows relatively suddenly after cert n etiologic factors notably those of n urogenic or psychogen c o ign Al though shock respo ds quite promptly to simple supportive measures it is important to remember that primary shock may proceed in idiously into th more serious secondary shock Careful observation of the patie t and co rection of the aggra vating factors are essential some of the more common ca ses of primary shock are

1 Neurogenic and psychogenic factors Painful stim li trauma fright unpleasant sights and odors
2 Asthen a Due to anemia acute infections chronic illness or to prolonged b d re t This s noted most frequently when p ti nts assume an erect postu e
3 Certain drugs e g n t ites and local anesthet cs

B <u>Seconda y Shock (D layed Prolonged or T ue Shock)</u> The on et of thi form of sho k may b and oft n is insidious The classical signs of cold pale or cyanotic skin swe ting t chy ca d a (ove 100) and a terial hypotension although valuable may appear suddenly and ve y often represe t fully d veloped shock Unfortunately advanced shock is often refr ctory to even the most vigorous anti shock therapy *Early recogni tion of shock is imperative The possibility that shock may occur m st always be anticipated* In add tion to the above m ntio d cause of shock (prim ry) seco dary sho k may sult from loss of blood (int rn l or xternal) lo of plasma i to the ser u body cavitie (perito it s) or nto t mati ed (crushed or bu ed) tiss es re t uma ad renal cort al nsuffi iency dehydr t on or ac te overwhelm ing inf ction (e g septic m a)

T atm nt of Shock

A *EMERGENCY MEASURES - act rapidly* Th rapy of shock will vary with the pathophys ologi l ha ges whi h ha e curr d a d which ar responsible fo the state of ho k *Restoration and maintenance of an effective blood volume is the primary emergency measure in combating shock* Dehy dration d m nish d blood v lum hyp ia m a infecti n hypoprot inemia acidosis v cular relax t on and other phys ological abnormaliti s may require p al tr tment

1 Body position Place pat nt in the hock posit on (see page 3) unl ss he has a h ad i j ry
2 Maintain adequate airway
3 Body warmth Keep the pat ent comfortably w rm Avoid chilling o exce sive externally applied h at si this will furthe dilate th p ripheral ves ls
4 Pain Co trol pa n (part cularly if sever) p omptly by th use of appropriate first aid m as es and nalg i dr gs Give mo phine s lfate 10 30 mg (1/6 1/2 gr) s bc t for pain b t emember that s bc t absorptio is poo in pati nts in shock In case of seve pain morphine sulf t 10 15 mg (1/6 1/4 gr) I V may be s d to gre test ad

va t ge *Do not give morphine to unco sciou patients patients who have head injuries or those with re piratory depre sion*
Avo d ov dos ge with m rphine bst t te b rb t rates nd salicylates fo s d t n and a lges wh nev r p s ble

5 Allay app he ion by r as i g wo d and ct n P nto barb tal sod um 0 1 Gm ($1\frac{1}{2}$ gr) o lly or 0 13 Gm (2 gr) s b ut o by ectal pp s tory m y be of val e

6 P rent ral flu d th py *Replace and maintain adequate blood volume* N d fo thi may b btained by the history vital s gn a d h mat r t st dies Th clinical d t rm at on of ffe t v blood vol me is d ffic lt howe er and is s bject t consid rabl v iat o Th e i no ingl t ch nic r l by wh ch to judg th fl d r q r m nts *Response to therapy is a valuable index*

a S li o gluc se l tio s G v imm diat ly 500 c phys ol gical salin o 5 10% de t o sol t n o 200 of 5% phy iological saline olut on (may b giv pidly I V while m ki g p pa tions fo pl sm s rum albumi o whol bl od) Plasma s um albumin and wh le bl od e t a mo tain d in r ase in bl od vol me thro gh th collo d l o mot c p es r ffe t tha d dext ose o lect lyte olut s

b Pl sma o s m lbumin A y of th va ous pla ma p pa tion s ch as d ied f n pla ma o serum alb min may b employed d pendi g up the v il ab lity Pla ma i m st ad ly p o rable may be r pidly set p f dminist t on a d d es not equi e p elim ry bl od typing Th q nt ty of pla ma to be giv n d p d p n th stag of h ck a d th r pons t th y b d upo b th clinical a d labo ato y st d

(1) Imp nd g hock Administe 500 c pla ma imm d t ly and follow lo ely l m lly and with hematocr t tud s to d te min n d f r f th plasma

(2) Ea ly or advan d shock Admi i t 500 c plasm imm d ately a d r p at with 500 c ev ry half ho up to total of two l t s d p nding po linical ou e and hem to it findings If hock p rsi ts follow ng s ch th r py th p gnos is very poo

c Whol blood If pla ma is un vailable r f an mia s p es t wh le blood may b dmin te d s n ed d

d Plasm xpa d rs Eviden e during th la t f w y supports the view that th e r ev ral eff tiv plasma b t tute fo em ge y t tm t of hock Th e g nt ha e high m l c l w ght high oti p ur d th e sary vis os ty Th y h v the dd d d t ge f not c using inf tiou h patit s

(1) D xt N N D (E pandex® G t ® Pl v l x®) a wat s l ble biosynth ti polys ch rid 6% n i tonic s l e ol ti n I V 500 1000 c at a at of 20 40 c /m USE CAUTIOUSLY in pat e t w th ard a o li s ffic cy Anaphylact d e tio s h ve bee ep t d In o d r to a oid hem dil t d s g ho ld t x ed that whi h m in t s yst l blood p e s e at about 85 mm Hg

(2) Plazmoid® a special purified and nonantigenic 5% gel atine solution in isotonic saline I V 500 1000 cc *to maintain systolic blood pressure at about 85 mm Hg*

7 Vasopressor drugs These agents are most effect ve in hypotensive shock without associated decrease in blood vol ume (e g spinal anesthesia syncope and ov rwh lming intox cations) although they have b en stated to be of some value in severe shock due to any cause They sh uld not be used in li u of more physiological me sures or spec fic treatment of the cause of shock In many instan es ser o s quest on may be rais d as to whether the blood pr ss re *elevation produ ed by the vasopres or drugs has a beneficial* or detrimental effect upon the underlying physico pathological disturbance (For example the actual influence of the al tered peripheral resistance on the blood supply to v t l or gans is ncompletely understood) Dos ge levels for the various agents are empirical and must b caref lly adjusted according to patient response (blood pressure and pulse)

a *Levarterenol Bita trate* U S P (Levophed®) 4 16 mg (1/15 1/4 gr or 4 16 cc of 0 2% sol tio) in 1 L of *glucose I V Avoid e travasation (may cause tissue ne osis and ga gr ne)* With concentrations greater than 4 mg /l ter co stant supervision and the use of an inly *ing catheter are requ red*

b Phenylephrine Hydro hloride U S P (Neo Synephrine®) 0 5 mg (1/120 gr) I V or 5 mg (1/12 gr) I M or by slow I V infu ions of 100 150 mg /liter of glucose

c *Meph termine N N D (Wyamine®) 5 20 mg (1/12 1/3 gr)* at a rat of 1 mg (1/60 gr) p r minut by c n tinuou I V infu on or 15 20 mg (1/4 1/3 gr) I M

d Meta minol Bitartrat N N D (Aramine®) 2 10 mg (1/30 1/6 gr) I M o 15 100 mg (1/4 1 1/2 gr) in 250 500 cc of 5% dext ose or 0 5 5 mg (1/120 1/12 gr) I V

e *Metho amine Hydrochloride U S P (Vaso yl®) 15 mg* (1/4 gr) I M or 5 mg (1/12 gr) I V or 35 40 mg (1/12 1/3 gr) in 250–500 c of 5% dextrose by sl w I V fusion

B Specific (D finiti) M u es

1 Ano a (or Hypoxi) Ano ia *is prob bly p ese t a* p i mary or omplic ting facto in all types of sho k th r fore *oxyg n may be con dered for most pat nts in shock* I som patie ts o yg n m y be ind at d fo other rea ons (cardiac fa lure pneumoni etc) However th patie t in impending shock is pp en sive a d th mask o i nt som times serves to inc eas hi apprehension

2 Dehydration *Admin ster 500 1000 c f physiol gi l* sali o 5% d xtros olutio I V o by hypodermoclysis as n ed d As oon a patie t c n wal ow give fluids by mouth Unless the e is pe ifi clinical o bio h m c l evidence of sodium defici ncy avoid administration of more tha one liter of physiologi l lin o the fi t day Sub eque t pa enteral fluids may b given as d xtr se sol tions (*ee pages* 7 10)

3 Adrenal cortical failure Ad enocortical steroid th py has bee fou d to b effective i sho k lik al tea s ociated

with er o m d l emerg cies Although t e tm f is mo t p cif c lly applied to sho k of Add n ri is it may also be of p cta ular v lu in c t in ut lle gic me ge i and o e whelmi g I lo i tion G e Hydro ortisone (f ee alcohol inf ion con t t fo I V use) 100 150 mg d luted in 1000 c 5% glucos or s lin by slow I V drip Hyd o o tiso e Sod m S ccin te N N D (Sol Co tef®) 100 mg m y b giv n in 2 cc ter l w t r isoto i salin I V over a o minute pe iod iti lly w th sub eq e t dos of 50 mg as q ired

4 Ca diac f l re Dig t l s d other t atm t f di f ll are i dicat d o ly fo thos pat ts with p e e st g r pr s nting vid ce of c rd failure (ee p g 18) D g talis i of n val e in shock d e to y oth r ca

5 I fe ti n Immed ate me s s should be tak n to comb t f ct on if p se t Ov whelming inf ct o r ap ble f p duci g e ff cient met b l hanges th body ti s s to p d spo to ho k P ophylact a t b tics are of doubtf l val e d m y e be h mf l e cept wh th h d of inf ct is g eat (g xten i b rns)

6 Hemo hage and m a Alth gh plasma is s lly giv a an me g ncy meas e i hock compli ati g h mo hag acut n m m t b o r ted by replacem t with whole blo d to prev t hyp xia Th q tity of whole blood to b giv n will dep d pon hematoc it t di

C Ev l tio f Em rg y Th py *Constant observation of patient is imperative* The pulse esp atio temper tu (rectal) and bl od p ss e should b evaluated imm di at ly d ve y 15 30 mi tes o oft e the e fter until the is def te imp ov ment of th p iph al ci c lat o

1 Rapid r ove y If vital s gn ret rn rapidly to n mal k ep p tient und cl ob rvati n b t withh ld f th anti hock the py Check vital sign ev ry half h r Pe f rm h m t rit t d if the is any uspic n whatev that s onda y h ck ex st R m mbe that hem on n trati n ually p de blood p e r nd puls changes Aft r limi ati g pot tial o exn ti g shock p od i g f c t s the p tie t m y b m ged xp t nilly t l it is ea n bly c rta n that d ger h pa s d

2 Prolong d recove y If the v t l igns em in ab orm l fo ven bri f p iod fte init l me s o sh w ev denc of f rthe p og ion of p ph l ircul tory fail e in stit t fu ther vigor s a ti hock the py Blo d hem globin RBC a d hematocrit ho ld b d t mi d imm d tely for base line nd ho ld b r p t d s oft n a ss ry t ev l te th re lt f th rapy

PAIN (Ge eral Aspects) (code No 518)

Con ept of pain and p n m hanisms e highly o t o e ial and fo that son all l ssific ti s of pain m i qu te a bitra y F p ti al purp es th r a two p ip l typ of pain pe fici l and d p P in i ha ply l caliz d in p ficial stru t and diff sely o poo ly lo l d in d ep r st ct r s D p p i may es lt in r f r d p P i m y c as a ult of

multiple types of stimuli acting upon the various body struct res The relief of pain may be achieved by removal of the stimul s or neutralization of the effects of the stimulus and when these are not feasible by dulling or obliterating the sen ation of pain

Analgesic D ugs

A Sal ylat s The most commonly used of the vario s analgesics and frequently employed for self med cation
  1 Actions and indication Antipyretic nalgesic antirheu matic and uricosuric useful i relieving myalg as n r algias a thralgias headaches and dysmenorrhea
  2 Prepar tions dosage and administr t on
    a Acetylsalicylic Acid U S P B P (aspirin or A A) plain or enteric c t d 0 3 Gm (5 gr) tablets Ordi n ry dosage is 0 3 0 6 Gm (5 10 gr) every 4 ho rs p r n 0 3 Gm (5 g) every 2 3 hours is stat d to be more effe tive and es lts in few r untoward r a t ons than l g r dos s at less frequ nt int rvals The plain preparation may cause gastric dist ss this may be avoid d by adm n stration of the d ug on a full t mach or with 1/2 1 tsp of baking soda or oth r antacid The nteric preparation is slower acting but it p events gastric irri tation and is also us ful for those patients who might be skeptical of th analg c valu of ordinary sp rin In cert in cases it may be nec ssary to administ r the powd ed aspirin rectally in a th n tarch past
    b Sod um Salicylat U S P B P plain or ent ri coat d 0 3 0 6 Gm (5 10 gr) every 4 hours p r n
    c Acetyls licylic a d compound (a pirin compound or A P C) a syne g stic ombination
       ℞ A tylsalicyl acid 0 22 gr iiss
       Ph nacetin 0 16 gr iiss
       Caffeine 0 032 g ss
       Sig 1 2 tablet every 3 4 hours p r n
    d Asp rin and cod ine p p ratio s (see b low)
    e An lgesi sed tiv mixt es
       ℞ Sodium s licylate 10 15 3 ii v
       Elixir of ph nob b tal q s ad 120 3 iv
       Sig 1 2 tsp every 4 hours p r n
       ℞ P ntob rbital od um 0 032 gr ss
       Acetysalicylic acid 0 32 g v
       Sig 1 capsule very 4 hours p n
    f Methyl Sali ylat (Oil of Winte g e n) U S P For ext rnal use s a lin m nt to sore mus l joint A 10% pr p ration in o l or ointm nt
  3 Untowa d ea tions Usually mild on i ti g of d es and so r tom ch but l g d m y ca e ti nitus de f ness blu ring of vi io n use d vomit g di h diaph e is he dache d deli ium I ti patie ts salicylat may c use rt c ias d a ut l y g i ed ma

B Acetoph netidin U S P Ph n cetin B P 0 3 Gm (5 g) e ry 3 4 ho r may b empl yed i c t n ca es of sali yl t intolerance In general how ver thi drug is more t x than *other analg sic preps ation* and pr lo g d is n t advis d Its principal lue is in analgesi combinat on (g A P C)

C Colchi in U S P (s e Gout page 321)

Narcoti Drugs

Drug which reli v pain and at the same tim produ e uph ria sleep o stupor P in r lief occurs p ior to loss of con ousn ss Ind cat d f r r lief of pain of degree gre t r than that controll ble by an lgesics or wh n p in is of type not susceptible to analge ic drug (e g vis al pain) *All of the following dru s require narcotic prescriptions These drugs should always be discontinued as soon as the need for them is past*

A. Codeine Pho ph t U S P B P

1 A ti ns and ind t ons Pharma ologically similar to mor phin but of less r int n ity C N S d p e sion in o dinary do ag s but C N S stimulation in high r d s ge dimin ishes cough refl x d cre ses bow l motility (constipating) Pref rr d ver morphin for reli f of mod ate d gre s of pain be ause it i mu h le s habit forming is m ch saf r and results in f wer untoward r actions

2 Pr paration d sage and modes of administr tion

a Codeine Pho phat U S P B P 0 008 0 065 Gm (1/8 1 gr) o ally or subcut every 3 4 hours p r n Ordin rily if 0 065 Gm (1 gr) is in ffe tive for analge sia u e st ong r narcot s sinc larger dos es of codein are tt nded by untoward side react ons

b Cod ine nd acetyls licyli acid (codeine and aspirin)

℞ C d ine phosphat	0 008 0 065	gr	1/8 i
A tyl alicylic a id	0 3 0 6	gr	v x

S g 1 tabl t ry 3 4 ho r p r n

Cod in and a etyl ali ylic a id ompound

℞ Cod ine pho phate	0 016 0 065	gr	1/4 i
A etylsali ylic id	0 220	gr	iiiss
Ph nac tin	0 160	gr	ii s
Caff in	0 032	gr	s

S g 1 tabl t ev ry 3 4 hours p n

3 Unt w rd re ctions Allergi reactions su h a urti aria pruritus cont ct d rmatitis and en anaphylactoid spon s m y occur Addi tion is much l ept to f llow use f th drug than us of m rphin

B M pe din Hyd ochlo d U S P P thidin Hydrochlorid B P (Demer l® Dolantin®) 0 050 0 100 Gm (3/4 1 1/2 gr) o ally or I M (not sub ut) very 3 4 h urs p r n t ted to b e pe ially u eful f r pain associated with smooth mus l spasm (x ept bil ry spasm) altho gh this is di puted It may be gi n to individuals who do not tol rate morphine and is le s pt than morphin to c us naus vomiting and r spiratory d pres on Analg sic eff ct is less than with m rphin Dilaud d® and methadon Add tion tende cy d finit ly ex ts

C M thadone Hyd ochloride U S P (Am d e® Dolophin ®) 5
0 005 0 010 Gm (1/12 1/6 gr) s b ut o I M e e y 3 4 hou p r n pr vid s analg ia of a level imilar to m rphin but is slow r a ting and has a mo umulative a t on It i t ted to be specially s f l fo th r li f of chron pain b a analg sic tol ran e d lops m e slowly than w th m rphin Untow d eaction to the drug are similar to thos d e to m r phin and the ddi tion t nd cy i ab ut the am The drug i not tol rat d w ll o ally

D M phine S lfa) U S P B P This drug r m i h most v i bi f th pot t na ic f g n al in cal us

RELATIONSHIP OF AUTONOMIC DRUGS BY MODE AND SITE OF ACTION

These ph rmaco l gi rel tio ships d ot nec s ily imply omp rable cli ic l actions and usefulness

	AT PARASYMPATHETIC EFFECTORS	AT GANGLIA (P ymp th ti Symp th ti)	AT SYMPATHETIC EFFECTORS
STIMULANT (E) for)	Cholin E t Ac tyl h line M th holin (M holyl®) C rb h l (D ryl®) B tha h l hl id (U h li ®) F rt thonium l did (Furm thid ®) h lin t l hib t Phy ostigmin li yl t (E ri e) N tigmine b mid (al) (Pr stigmin®) N ostigmine m thyl lf te (s c) (P tigmin®) I fl roph t (DFP Fl rop yl®) O t m thylpy opho ph ramid (OMPA) Oth Parasymp h t Stim lant Pilocarpine M carine A lin (hi t l al int e t ly)	Ni t (Sm ll Do t an i t ffe t) (hi tori al inte est only)	Ep ph (d nal) Le l l(p ,h) I p ol l (I p i® Al d ®) Norl odrin ®) Eph d in Synth ti Eph d in lik Ami Phe ylephrin hyd ochlorid (Neo Syn phrine®) Ph ylpropan lamine hydrochlo ide (Prop d in ®) P doeph d in Amph tamin Amph t min s lf t (Be ed in ®) D t o mph tamin s lfat (De d l ®) M th mph t mi e hyd hl ride (De yn®) Hyd yamph t mi hydr b omid (P d i ®)
(I hibit ry)	t al Bell donn Alk l ds At opin lf t B ll donn (tin tur and xtr t) S opolamin (Hy in) Hyos y min yn h ti Alli d R l t d Dr g H m t pin hyd ob mid l H m tropi m thb (N vat l ®) Amp ot opine pho phat (Sy t pa ®) E tropi (E phthalmi ®) Adiph nine (T as tin ®) P vat i ®	N t (L g d) (h l) Ammon um C mp d H m tho i m hl d (M thi m®) H m th i m b om d (Bi tri m®) Chl i d min hl id (E lid®) M c myl min hyd chlo d (In in ®) P t li m t t t (An ly ®) Cur (hist i al int t only) (larg d s n essa y f d p ant tion)	C t l and P ph l Dep ant E gotami t rtrat (Gyn g n®) E g vi mal t (Ergot t ®) E g t in Dihydroergotamin (DHE 45) Dihyd oe g ine (DHO 180) Symp th lytic Ag t Dib min ® Y himbin (hi t i l i t t only) T l olin (P i li ®) Ph t l mi hydro hl id (R giti ®) Pipe hydro hl id (B d i ®) Hydr l i hyd ochl id (Ap l ®)
		D b t lin lf t (Dibulin ®) M thanth li b mid (B thin ®) Oxyph onium b mid (A t yl®) Diphem l m hyl lf t (P l®)	

1 A tions and ind cat on C t al n vous yst m dep ssi r ulting in p w ful analgesi asso iated with s dati e pho ia and hypno is lectiv respi tory nte depr s s n and d lling or ab liti n f th ough flex It in eas intracra i l p sure h s ma k d useating and met effects in cert in pat ts h ma ked con tip ting eff ts uses sp sm f bili y and u ter l mooth m s le i u e ful in providing r lief from acute or pr l g d eve pain e p ially pain arising from onditi s whi h a of le s than 10 14 day dur ti n The drug may b valuable in the t at ment of sev r a d dy pnea (g pulmo y ed ma c d ac a thma f left v ntr ular fail re) It i a c m monly u ed and valu ble p oper tive drug
2 Cont ind t s Mo ph sen tivity bro hi l thm surgical bdom l d e (u d gnosed) h p t d ea hypothyroid m morphin sm head i jury Add on dis se and cir umsta wh n vom t g m y be dang ou
3 Prep at ons do g s and mod of dminist tion
   a Morphine S lfat U S P B P 0 008 0 015 Gm (1/8 1/4 gr) lly o sub ut In as a of s v r agoni ing pain sp lly p in ass i t d w th imp nding neu o g nic sho k (g a te pan r atitis) the drug may b gi n slowly in 5 c phy iol gic l alin I V
   b Belladonna lkaloid s h s tropin and sc p lamin in dos g of 0 0003 0 0006 Gm (1/200 1/100 gr) ubcut Wh n administ ed im ltan o sly with mo phin m y red c s me of the u t ward ffect of morphine
4 Untoward actions Hypn i (m y b und irabl) pi tory dep s on n u a and v mit ng, s v e stip t n all gic spon s (urti aria prur t and anaphyl toid tion) Add tion t nd ncy s gr t

E D hydrom phin Hyd o hlo d , U S P (Dil ud d®) 0 00 5 Gm (1/24 g) lly r 0 001 0 004 Gm (1/60 1/16 gr) bcut v y 3 4 h s p r n st t d to h ve f w r un toward eacti ns (us a vom ting o stip tion) than m rphine

Loc l A th ti s
A Cocain Hyd ochl id U S P B P 10 20% s l tion fo top l o and th t ppl at ons
B D b ai Hyd ochl id , N N D Cin ho ain Hyd o hlo ide B P (N p aine®) lut ons of 1 2 000 t 1 1 000 inje t d locally fo nf lt ati an thesia (Not over 100)
C Ethyl Aminob n o t U S P B o i B P 1 20% oint m t applied loc lly
D Ethyl Chl ride U S P B P sp ay d locally until formation of t an ent wh t f ost oc urs
✓E Pr in Hyd ochl id U S P B P 0 5 1 0 1 5% ol tion f infilt tion an th

Ge er l A sth ti
Eth admin st red by d op inhalation m thod or admini ter d ctally in g tabl oil āā 30 90 c (1 3 oz)

A t ids and A ti p modics Se pages 264 nd 266

V moto D g Se pages 34 nd 211

RELATIONSHIP OF AUTONOMIC DRUGS BY MODE AND SITE OF ACTION

Thes ph rmacol gi rel ti nship do not ne s ily t ly comp rable li ic l actions and usefulness

	AT PARASYMPATHETIC EFFECTORS	AT GANGLIA (P ymp th ti Symp th t)	AT SYMPATHETIC EFFECTORS
STIMULANT (E i tor)	holin E A tyl holi e M th holine (M h lyl®) C b h l (D ryl®) B th h l hl id (U e h li ®) F rt thonium iodide (Furm thid ®) h lin t Inhub t Phy ostigmine s li yl t (E l) N ostigmin b mid (oral) (P ostigmin®) N ostigmin m thyl lfat (s) (P ostigmin®) I fl roph t (DFP Fl p yl®) O tam thylpy ph ph mid (OMPA) Oth P asymp h t Stimulant Pil pine M ari A lin (hi t i al int t only)	N otin (Sm ll Do t an i t fl t) (hist i al int t only)	Ep phr (d nali) Le l l (p ph) I p ot l (I p l® Al d ® N i od i ®) Eph d in Synth ti Eph d in lik Am Phe ylephrin hydrochl id (Ne Syn phrin ®) Ph ylp opanolamin hyd ochl ide (P p d ine®) P doeph d in Amph tamin Amph t mi lf te (B d in ®) D xt mphetamin lf t (D d i ®) Meth mph tamin hyd ochl id (D soxyn®) Hyd xyamph tami e hyd b omide (P dri ®)
I hib	al Bell donna Alkal ds At opin lf t B ll d nn (tin tur and xt t) S opolamin (Hyoscin) Hyos yamin ynthet All d R l d Dr g H mat opin hyd ob omid o al H m tropi m thb (N vatri ®) Amp ot opine pho phat (Sy t pa ®) E catropi (E phthalmi ®) Adiph nine (T tin ®) P vat in ®	N in (L g d) (h l) Amm um C mp d H m th i m hl id (M thi m®) H m th i m br m d (B t i m®) Chl d min chl id (E lid®) M mylamin hyd hl d (In in ®) P t lin m t ri t (An ly ®) C (hist i al int t nly) (l g do e y f r d p ant ti)	C l and P ph l D p ant E gotami e tartr t (Gyn g ®) E g vin mal t (E got t ®) E got in Dihydroe g tamin (DHE 45) Dihyd oe g in (DHO 180) Symp th lyt Ag t Dibe amin ® Y himbin (hist ic l i t t only) T la lin (P is lin ®) Ph t l mi hydro hl id (R gitl ®) Pipe hydro hl id (B d i ®) Hydr l hyd ochl id (Ap li ®)
	Dibut lin lf t (Dibulin ®) M thanth li b mid (Banthin ®) Oxyph onium bromid (A t yl®) Di h m il m thyl lf (P l®)		

1 Actions and indi tions Cent l nervou system depr sion resulting in powerful analgesia as oci t d with sedation euphori and hypnosis s l ctiv respiratory c nter depr s sio and dulling or abolition of the cough r flex It in eases intracranial pressure h s ma ked n useating and emetic effects in certain p ti ts ha ma ked constipating ffects aus s p sm of bilia y and u eteral smooth m le is us f l in pro iding relief f om acute or prolo ged s vere pain especially pain arising from conditio s which are of less than 10 14 days du tion Th drug may b valuable in the tr at ment of se er ardia dyspnea (e g p lmona y ed ma o cardiac asthma of left v ntricular failure) It i a c m monly sed and val able pr operative drug
2 Cont indic tions Morphi e sensitivity bro chial asthma surgical abdomi l di e se (diagn sed) hepatic d sease hypothyroidism morphi ism head i jury Add n s dis ease and circ mst nc s when v miti g may be d gerou
3 P epar tions dosag s a d mod s of dmini tr tion
   a Morphine Sulf te U S P B P 0 008 0 015 Gm (1/8 1/4 gr) o ally r s b ut I cas s of ev re ag nizing pain esp ially p in associ ted with impending n u o genic shock (e g acute panc atitis) the drug may be given slowly in 5 cc physiologi al s lin I V
   b B ll donn alk loids uch a st opin and copolamin in do ges of 0 0003 0 0006 Gm (1/200 1/100 g) s bc t Wh administ red simultan ously with mo phin m y reduc some of the u toward effect of morphin
4 Untoward eactions Hypnosis (may b undesirable) respi a tory d pr ssion n s a and vomiti g, se e co tipation all gic e pons (u ticaria p it s and anaphyl ctoid reactions) Addiction t den y is g eat

E Dihyd mo phi Hyd o hl rid , U S P, (Dilaudid®) 0 0025 Gm (1/24 gr) or lly 0 001 0 004 Gm (1/60 1/16 gr) s bcut ev y 3 4 h urs p r i st t d to h v f we un toward reactions (ausea vomiting onstipati n) than morphine

Lo l A sth ti s

A C c i Hyd o hl rid U S P B P 10 20% s luti n fo top al nos and thro t appl cati ns
B Dib i Hyd chl ide, N N D Ci hocaine Hydro hlo id B P (N p ai e®) oluti s of 1 2 000 to 1 1 000 inj ted locally fo infiltrati n an sthesia (Not over 100 cc)
C Ethyl Aminob n o te U S P B n ocaine B P 1 20% oint m nt ppli d l lly
D Ethyl Chlo id U S P B P pr yed locally until fo m tion of a t an i t wh t f o t ure
✓E P o in Hydro hlo ide U S P B P 0 5 1 0 1 5% solution f infilt ation an th ia

G eral A theti

Ethe admi ister d by drop inhalation method or administered rectally in v getable oil āā 30 90 c (1 3 oz)

A tacids and Antisp smodic Se pages 264 a d 266

V m to D gs Se page 34 a d 211

Autonomic N rvous System Drugs

Disorders of the autonom: nervous system are encountered in a wide variety of diseases both as primary and secondary manifes ations The number and variety of drugs wh ich are use ul ir the treatment of these disorders has recently increased the pharmaco logic relationship of these drugs is shown in th chart on page 34

PSYCHOTHERAPY

Medical Examination

Although psychiatric diagnoses must be made on psy hiatric findings and must not be based solely on exclusion of organic fi d ings a ca e ul medical examination (history physical xamination and laboratory studies) is of the first sign cance in approac ing a patient with suspected psychogenic d sorders A thorough clinical history an have considerable r assurance value when psychoso matic relationships are discussed with pati nts I is really impor tant to po nt out rot only that organi and psychiatric ailments can co exist but that they are almost invariably interrelated

A *Avoid* either or conc pt of diseas (i e either organi or fun t onal) both are u ually present

B *Do not* order repeat d or prolonged studie mer ly to im pr ss pati nt (e g extens e investigation of organic trivia)

C *Do no* onvey unconfirmed suspicion of spe ific organi disease to patient

D *Do not* hosp talize unless n cessary espe ially if this means exposure to chroni ally ill pat ents

E *Do not* eglect medical studies on the p eliminary suppos t on that pati nt s compl ints e f n tio l

Psychiatric Examination

A carel l psy h tr c examination usually ha b th diagnostic and therapeut c alue Expand th usual ase h story to include in quiry into th patient s mot onal difficulties The thoroughness of this questioning w ll a tually depend upon th g n case but c rtain basic information is essential Question slowly and pati tly The examination should incl d h story and obs rv tion of the following

A H reditar F to s Family history of psy h atri and consti tutional inadequacies

B E ronm tal F tors D ring D pment Fa y h ldhood train ng and xp iences f m ly lationshi s a d important fr ndships soc al elat on h p desire and tereats s x experi n s and tt tud s o t o al i al i g and xperie e person l amb ons rel g o s att d

C Pr cipitati g Fa tors Cons d e p i lly ro a tic d ffic tie dome ti a d occ pat onal probl m f n al e s s anx ety o er he lth pheavals in way of li i g death in family o erwo k and fat gu

D M nt l Stat s Of al e in disti guish g e rot f om psy chot c c mplaints Biz r e somati compla nt r freq ntly coun red in both n uros s ard p ychos s

1 Gene al b havi r Appearan e speech a t on d tiri des

2 Emotion (mood) An ty agi at on elation o d p ss on

3 Thought or ent Ill sio s del sions or hallu i at ons

4 S nsorium Insight intell g n e or entati memo y

G al Tr tm nt

A T tme t f Psy hosomati Sympt ms B fo e dis ov ing a d moving the s of t ns on t may be dvis ble to giv relief by tre ting symptom *All p sitive or concrete medical measures have psychotherapeutic value* R pid re pons to s d ti a d a ti pa mod drug m y be t liz d to po t o t us pi bil ty to t tm t a d f ncti n l n tur f d s a e A c f l explan t f at on l of the th rapy should foll w ng s mple u de t nd ble te m U ef l m d e wh h m y mat r ally gme t (but n t repl ce) prog am of psy h the py in lude t q l zi g o stim l t d gs In d cated (s e p 4) Ph oba b tal a d the wer t a age t hav p d of g at v l in th ma g m nt of p y ho ge c dis d A widely u ed time t sted a d h ghly s ce f l p script n s th so lled tispa mod m t e

℞ T ctu of Bell do 10 0 3ii s

El ir of Ph b rb t l q d 120 0 3i

Sig I t p t i d 0 min a c i ½ gl s w t r

B Pl n g of Hyg e c L ing R gim P ovid for optimal physi l d m t l um t to l lit t reco ry

1 I ur deq ate t it on w th eg l r b l n ed me ls

2 Pl n a work ble l vi g hedule w th all wan e for prope e rcis re reat o r st a d sl p

T tm t of Sit ti n l Ne osi (Acute emotio al d o d r d e to u de ir bl xt al t es s)

A Permit the p t nt to tell h tro bles (m ntal th s s) Le d g q st o s s co id bl t me but t is g e ally b tt to allow th p tient to tell his ow st y

B H lp the p ti t to r ct o Il t situat al f cto s

1 Util e l g l so l s i o welfa ag s s d at d C t t family o a ci tes to obt dd tion l i fo m t on d ff t d d ch ge v ro me t

2 D t d a d ass stan tow rd s mplif tio of p o l p bl ms Ch ge i v o me t m tal t tus o cup tion l tat t m y at t m be mp s ble d m y compl t ath th s mplify problems H lp p t nt f d h olut b t all w him to m k his own d s o

C D t min th p t ts a n fo h s t n t his tu t If th p te t is ss ted f g h p bl m obj ct ly lte d ph l s phy o ch g i attitud tow d thes am p ob l m m y make h l fe s t t on m e tol ble

D Utili e s bl mating (d v ting) tech i En g p t ent to d lop oth r i te ts po t h bbie a d k lls pa t u l rly whe patie t h exce s of tim fo lf p e p t o

E Us ki dly ttit de Re u c gg t p su o d e en dmo to m y b ful as th as dema ds Av d p o hing a g g w th pati t

T tm t of D ep t d N o s (Chro emot on l d o d s du to t l confl t lly dat g b k to h ldhood)

A R d cat on ie t t te hni sh ld be leg ted to t ain d p y h at ist If s h n t av l bl impl ympto matic and s pp t v m di al m asu e d s v the gr t t con ider tion

B *AVOID*

1 *Avoid* brutally conf onting patient with causal factors of neurotic symptoms

2 *Avoid* premature interpretation of psychiatric data

3 *Avoid* anger toward patient because of failur of improve m nt

4 *Avoid* prolongation of psychiatr study and treatment when it is evident that case progre s is unsatisfa tory or danger ous In such ca s it is better to refer the patient to in dividuals more versed in psychiatric methods

a Psychoanalytic principles and technics may be indicated

b In inexperienced hands psychiatric meddling may be fraught with dangers Neuroses are defen ive barriers of symptomatic id as and if these are broken down an emotional crisis may be pre pitated or th p tient may have undue resentment toward the examiner

5 *Avoid* aggressive psychoth rapy during acute or symptomati phase of patient s disease

E al ation of the Dep ssed Patient as a Suicidal Risk

Th s pat nts must always be reg rded as pote tial suicides but certain att tudes and responses assist the doctor in d termining this possib lity

A R spo e to Direct Qu stio ing R g rding S ic dal Int nt A patient who is afraid he may omm t uic d is n t ry apt to do so A pati nt who feels that he dese ves to die or that life holds no hope s apt to commit suicide Thes patients may think of su de but caref lly con al their intentions

B Doctor p tient Relat o hip If a patie t rem ns d p essed in spite of th do to help the pati nt is a poor suic de risk If a pat nt is reassu d by the docto after a rea onable visit he is less apt to be su idal

C R a tion to Pat ent s Norm l Env ronme t A patient who has withdraw from routine li g is a poor uicidal ri k The pati nt who ve with effort ontin e normal daily conta ts and wo k is probably ot so apt to b icidal

D An in rease in neu otic symptom usually ind cate the patient is not l kely to commit i ide Th s a e defen mechanisms

INSOMNIA (Sleeplessness) (cod No 916)

Insomnia is eith r a fail re to fall asle p f q ent aw kening from sle p or inability to emain asl ep for no m l p iods I di idual sleep requirem nts howeve m y ry g tly The causes of insom ia are m ltiple Emotio al or me tal p occupa tion is th commonest cause of persist nt i omnia

A Psychoth rapy Direct measu e towards co rection alle viat on of isting anxi ties (see page 37) M l rela ation te hnics and physical therapy method could be includ d und r the h ading of palli tive psychoth rapy

B G ne al M a ur s

1 Promotion of optimal g neral health

a Easily digestible foods in reason bl quantiti

b Treatment of existing syst mic disea e

c Adequate re t recr ation vacations

2 R l f of annoying symptom which interfere w th leep
a Pain (ll types) d Py o i g N l obstruct on
b P itus D h h Dyspnea and orthopnea
c Na a f Cough i Urinary d stu banc
3 Quiet pre b dtime activity R t tion of x iting act vit e specially in th pre bedtim pe iod is an individ al mait r It i prob bly ad i able for susc pt bl individuals to a oid exciting or thought p ovoking reading gam s d am or movi s for a p iod of 1 2 o mo e hours before bedt m Encour ge light read g and othe non exciting activit s
4 Re tri t on of stimulati g b v ag s and drugs sp c ally aft 3 00 p m e g te offe tob c o ephedrin lik d g and amph tamine compounds
5 Provision of ad quate sl eping f c l ti g omfortabl b d and a quiet and da k room with s t bl nt lat tem p tu and hum dity
6 Wa m bath b fore b dtim may h ve a elaxing eff ct
7 Warm milk tak n at bedtim m y al o h ve a relaxing ffect

C Sed t e a d Hyp ot Agent Th outine e of hyp otic drug to o t ol i mn a i n to ly mp op b t m y also be *dang rous* b us of hab tuati n d l r m d ge of f lling f m bed te The follow g g ts may b u d
1 Win (weet h y o sim la) 60 c (2 o) or lly h
2 Wh k y 30 cc (1 o) d l ted w th wat o ally h s
3 Ph nob rb t l U S P Ph ob bito B P o lly h slow (30 60 minutes) ct o and a p lo g d eff ct (6 8 ho s) and pati t pt to h e a hango e It e et d by kid y and so o t ind ted r l insuff cien y
Ph ba b tal U S P Ph nob rb ton B P 0 015 0 03 Gm (1/4 1/2 g) b d q d as a s d t v d g th dayt m m y d an iety o te s n uffici ntly to obviat th n ty fo hypn t do of b b t ates t ght D ow d di i ese m y b ov r om by ca f l adj stme t of th d g o ding to d dual quir m nts S ll d f i l e of th b b tur t s a t quil and pharm olog d eff ct d t ty a e freq tly d to improp d sag adj tm t Th hyp tic dos f ph obarb t l 0 1 0 2 Gm (1 1/ 3 gr) o lly h p r
b Ph nob bit l Elixir U S P 16 3 cc (4 8 d) n tain 16 mg p r 4 c orally h p n
Ph nobarbit l Sod um U S P Phen ba biton Sodium B P 0 065 0 1 Gm (1 1/ gr) 10% s luti sub ut p n
4 P tob bital Sod um U S P P tob rbito e Sod um B P orally h m r pid effect (15 30 minut s) and horter d ation of acti (4 6 hou s) than phenob rbit l It is ex ted by th liv and i th fo ont aindi ated in h p ti ins fflci y
a Pentobarb t l Sodium U S P P nt b biton Sodium B P 0 1 0 2 Gm (1 1/2 3 gr) o lly h s p n
b P tob bit l Sodium Elixir (N C A) 16 32 (4 8 d) ont in 20 mg p 4 c o lly h s p n
c P t barbit l Sod um r t l pposit y (N C A) 0 13 Gm l 2 in rt d ect lly h s p n

d Pentobarbital Sodium Sterile U S P 0 5 Gm ad ministered as a fr shly prepared 5% solution I M or I V (slowly and not more than 1 cc per minute)

Toxic reactions to ba biturates include xcitement and delirium (especially in child en and in elderly debil tated or febrile patients) drug addiction barbitu ate derm titis and circulatory and respiratory depr ssion (se p 536)

5 Chloral Hydrate U S P B P (12 5% Sol) 2 4 cc (0 25 0 50 Gm) orally h s p r n

6 Sodium Bromide Elix r N F (17 5% Sol) 1 2 dr h s p r n

7 Paraldehyde U S P B P A us ful agent since the clean sto k solut on is st rile and an b used for o al r ctal I M o I V admin tration as needed The drug ha an unpleasant odor It may be used in d lirium

a Oral 4 16 c (*1 4 dr) in cracked ice* with milk fru t ju ce or whiskey

b Rect 1 16 32 cc (4 8 dr) in 30 60 cc (1 2 oz) of a vegetabl oil (i 2 1 dilution)

c I M 5 10 cc (1 2½ dr) (Pr ferably d ep in b ttocks)

d I V 1 2 cc (15 30 ♏) in triple vol me sterile saline very slowly *CAUTION May cause respiratory arrest or pulmonary edema*

8 Antih stami e The e drug re b g us d widely f thei sed t ve effect (se p 45)

9 Tranqu liz g d gs See b low and pp 42 43

TRANQUILIZING DRUGS
(S e t ble on pp 42 and 43)

The t nq l ing o at ra ic drugs hav been accord d a wid acc ptance d new pr parations re b ng i troduced t a rapid rat They being used in the sympt matic t atment of many psy ho omat d fu ct o al d t ba s fo which the b r biturates b mid s nd sim lar drug ha e b e u e sfully em pl yed in the past There is o do bt that these g nts have made an mport nt ontributio pa ticul ly in the fi ld of psychi try If the p bl ity which h s s ou d d th i t od ction of thes new agents h done noth g els it has in eased prof s o al d p blic opt mism tow rd s rio s psychiatr di d and bro ght abo t a clos r m rr age of psych atry with o g ic med i Howev a cautious d cons rvativ approach tow d the r o tinu d w de pr ad use is ind c ted Th wildly enth asti r po t of ly in e ti g tors have be n se io sly qu stio ed by th result of som ec nt st dies and the mporta t p oblem of toxi ity and lo g term effe tiv n s a e now r c iv ng th ir de erv d me au of att t o

The tranqu li ng agents h ld b us d with cautio p oper tiv ly because of thei tende cy to agg a at the hypot io whi h may b encou tered in the admini trati n of io al o g r l a esth tics

None of the e drugs can take the place of convention al psychiatric techniques aimed at determining and rem ving the cau e of the illness

Ph th C mp d

Pharmac log cally th ompo nds most closely fulf ll th pt of tra quil ing d g n th t th y serve to r duce psych t w thout rr po d g d t ve or hypnotic effect U fo t t ly th y ar not d o d of to ty Pri ciple t c ff cts to date hav b ob d w th Chlorproma ine U S P (Tho a in ®) th f st of th g p to be nt od ced although it wo ld em lik ly that th mo e tly mark ted relat d ompou ds ho ld b mpl yed with the s me c ut (S e tabl on pag s 42 43)

R w lf Prepa ti s

Ra w lf a a d t alkalo d o g lly re omme ded for a wide v ety of t ion t t a d p y h d st b ces are now bei g employed o a th mo e lim ted bas s fo th t tm t of t ial hype te s on d the m re ou psy h d so d s To ctio d ple t d ff ts are fortu ately not u com mon (S table o pag 42 43)

M p ob m t N N D (Miltow ® Eq 1)

Th drug made it d but a n d t v t q l er how ev altho gh mep bam t s a useful d g for th t eatme t of i ty tat s d p e ce has d mo trat d d f t e d t v d hyp oti ffects Ex do p d p ato y a d ir lat y d p om d n d th To ty d sid effects m y r n comme ded the apeut c d sages of the d g (Se table on p ges 4 43)

Oth N b bt t T q il

Th ery n mb of th w g ts a d the lim t d l l p en w th th m make any u t l t o diff c lt (Se t ble on pag s 42 43)

ALLERGIC DISORDERS

All gic d so d rs m y b ma f t d by g ali d y t m c t o by lo li ed e tio s any org n syst m of th body Th e ct m y b a t ba ute o h i and m y b ed by n endl ety of offend g ag t (a t g) M y f th bs r o all d id p th di o de s of the human body s d d to h p s ble all g g S v l diffe e t v ties of all gi ti ty h v b d ribed

N m l Alle gi (C ke)

D l pm t f e s t tio th o gh o ta t w th th ant g m e or l app t Th e t o s ur n a l g pe cent g of no mal divid al without v d t h d t y p d spo ti Th di gn i may b r adily o f med by app p at ski t t ng th ap t t i l (CAUTION)

PSYCHOTROPIC (MOOD ALTERING) DRUGS

TRANQUILIZING (ATARAXIC) DRUGS

Nam	U ual Ad lt O 1 D	I d ti	C t di ti	S d Eff t
AUTONOMIC SUPPRESSANTS				
Ph thi 1 e Compound Chl p m i e HCl U S P (Th ra i ®)	10 25 mg b i d q i d	T i a d p ti tat b h di d p y h mit i g t t bl pai hi p thm p it drug and 1 h 1 w thd aw 1 ympt m d li i m t m p ki ni m M m di	Com t e st te d t C N S d p t (al h 1 b bl t t ti) pil p y (?)	D ow in bl d dy i j undi p t al hyp t a on t hy di d y m th 1 g ti p ki m ph t s t ty ul i
P m in HCl N N D (Sp in ®)	75 50 mg b i d q i d			D w d p t 1 hypot n ul i
M p i (P t 1®)	25 50 mg b i d q i d		?	D w d y m th bl d vi i t pati hypot i
P hl p i N N D (C mp i ®)	5 mg t i d q i d		?	S Chl p m
Ra w lfi Alk loid				
R pi e N N D (S rp il®)	0 1 0 75 mg d ily	S ve t d with t i ty d git t t m j p y h t i 1 hype t	D p i t t (ti) p pt c ul	M tal d p i i t ffi s ightm p pti ul ti p ki o m dry m th GI di t ba
R lf N N D (R di in®)	50 500 mg d ily			
R nam (Mod il®)	0 25 0 5 mg b i d			P b bly bo
Diph ylm than Compounds				
A cycl nol (Fre q 1®)	20 mg t i d	P y h with hall t ti s d d 1 t d lin	N t t d	Ski h
Hydro y i HCl N N D (At ax®)	25 mg t i d q i d	N i t d w th t xi ty and git ti	N t t d	D w GI ympt ms
B ty i HCl N N D (S itil®)	1 mg t i d	M ld an ty tat d b mpul i ti p y h m ti di de	H tility d p ph bi p hy t i gl om	At pin lik ympt m 1 ti 1 m i f li g f un lity di I ti
TRAL RELAXANTS (B bit t p g 39 B m d p g 40)				
ubstitut d Propan diol				
M p bam t N N D (Milt wn® Equ nil®)	400 mg t i d q i d	A xi ty and t nsi tat i mni p ti t t fib iti diti 1 h li m m t 1 t petit mal	N tat d	H bituati (?) ti i p rp p it ki h d w i h d h yn p

M ph i N F (T t l®)	0 5 3 Gm t i d q i d	Limit d li i 1 al i t i d p i t t	N t d	R 1 k pe ia
MISCELLANEOUS COMPOUNDS				
Ph gly d l N N D (Ul ®)	300 mg t i d q i d	A xi ty and t i t t	N tat d	D w l (l g dos)
Eth hl yn l N N D (Pl idyl®)	500 mg h	l m i	N tat d	N t i d
E yl , N N D (N yn®)	150 300 mg t i d q i d	A i ty d t i t mild d b h l l di t ba	N t t d	N tat d
Gl th mid N N D (D ld ®)	0 25 Gm t i d , p	In m		

CENTRAL NERVOUS SYSTEM STIMULANTS

SYMPATHOMIMETIC DRUGS

Epin ph in G p (Epi ph i HCl U S P p g 419)

Eph d l S ll t U S P Ph yl ph i HCl U S P (N Syn ph l ®)	25 50 mg t i d q i d	N i p y rt i l hypot d g pol l g ll gl di d my th ni yn p	C di va di hy p thy ldl m digi tali R git ti	l mnl i m h d h p lplt tio w ting tig phl t p m
Amph tamin D i ti				
Amph t mi S lf te U S P (B d l ®)	5 10 mg b i d	Mild t d p l b lty l th gy l p y t i l hyp t l	O ti lty git tl phed i ltt ity di la dj hype t si	Ce b l itati t m l it bility nf l d ll i m ltl s p i Gl di t b hythmi gi al pal y pe hock
D Amph t mi S lf t U S P (D d i ®)	2 5 5 mg b i d			
M th mph t mi HCl U S P (D yn®)	2 5 10 mg d ily			
MISCELLANEOUS COMPOUNDS				
M thylph ld t HCl U S P (Rl ll ®)	10 mg b i d t i d	Mild d p i f tig l p y il b h i di t b e	O r eti lty git tl	I m i d x it bility (?)
P p d l HCl N N D (M t ®)	2 5 5 mg d ily	Fun ti l f tig mild d p i	Agit ion xi ty h , b mp	I m i and it bility (?)

*D t th id bil ty i d g d pon f h g i iti gg t d th t th lin f mil i hima lf w th dd i al dat t be f d i th m di l lit t d i th m uf t r pa k g i f m ti

A Serum sickness
B Drug an phylax s (see below)
C Dermat tis venenata (see p 67)
D Tuberculous sen itization (see p 129)

Atopic Di ders (Coca)

Thes atural or sponta eo s allerg occur abo t 10% of the population oft n with a h reditary backgrou d Antige c etiology is much more obscur th n the c e of th ormal allergies Determination of the alle g ns s much more diff cult since complete reliance cannot be pl ced upon linical h story ski tests or eliminatio diets Cl nical o *therapeutic tri ls ar often* misle d ng Eosinophilia is charact ristic b t cert inly not p thog nomic of atop c di o d rs

A Hay fever (llergic rhinit s) (see p 112)
B E zema (see p 70)
C Urticar a (s e p 78)
D Angioneurotic edema (see p 78)
E Alle g purpura (see p 244)
F Allerg m grain (see p 344)
G All rgic asthm (see p 115)

An phyla t c R acti n (An phyl ct Shock)

A aphylacti react ons a the imm di t shock l k and fre q ntly fatal reactions which o ur with n min t s afte pare t ral adm nistratio of for ign sera or drug Although the e is oc sio ally no history of pre io s exposure to the foreign bsta th se cute eactions u doubt dly rep e nt i d ed hyp rse si tivity Anaphylact c rea tio s to s ra penicilli a d other a t bioti s and practically all other repeatedly admi iste d pa e teral *therap utic agents may occu It is for this rea on that po tentially life-saving drugs should not be administered in discriminately by oral topical or parenteral routes* Likew e it s prob bly b st to ha e mergency drugs vailable in the event of an phylaxis Pen illin se inject ble (Neutrapen®) 800 000 unit I V followed immediately by 800 000 n ts I M has b n r ported to b of possible val e n p nicillin naphyla s Expe ence w th this d ug is lim ted

Symptoms in l de apprehension pa esthesi s generalized urtica a or edema hoking s sation yanos s wheezing co gh i conti ence shock f ve dil tation of pupils loss of onsci s ness and co vulsions death may oc r within 5 10 m ut s

A Emergency Tr atm nt (URGENT)
1. Epinephrin Hyd o hlo de U S P I of 1 1000 olut on (1 mg) I M IMMEDIATELY and r pe t d i 5 10 minute a d later p r n It may b n ess ry to gi e 0 1 to 0 4 cc *f 1 1000 sol tio dil t d in 10 cc sal e* SLOWLY I V
2. Place in ho k position Keep wa m
3. Mainta n adequ t airw y
4. Diphenhyd amine hydrochlorid (Be adryl®) aqu o s 5 20 mg I V imm diately
5. Posit ve press re oxyg therapy (e p 148)
6. Ami ophylline 0 24 0 48 Gm i 10 20 c of sali e SLOWLY I V may b of al

B P ve tio
1. Pre a t ons Be aware of the danger Avoid using poten tiall d gerou d gs u less the is a definite n d *Avoid givi g drugs to patient with a histo y of h y f ver*

thm o oth all rgi co d t ons nI n ss y Do n t admi ter dr g to wh ch a pe h p io ly h d lle g c manif tat s

2 S multan us dm ı t atio f antihistaminı drug Re d ti n of fr q ency d e ty of a phylactic r cti s by me s f th a tihistamin drugs has been epo ted Pa ent ral pr p rat ons f th v i s antihistamin added t the d g dil t a e s d to be q llv ffe t e D phenhydr m ne hydro hlo de (Ben d yl) or tripel n mine hydr hl ride (Py ib n am e) in 10 20 mg do es h s b n s gg ted The a tih tami s do ot gua a t e af ty gai st a phyl x in ta n hyp se s tiv ind vid l
3 Adm t at on of co ticot opin (ACTH) 1 2 ho s p ior to d ug ı t n ha b n suggest d but cl nical xp r ence is I mit d and at b t d ff cult to v luat (CAUTION)
4 D se itiz t on (p 495)

<u>Antih stam n D ug</u>

Th anth t m n dr g f m a g o p of chemi ally r lat d g nt wh h appe to blo k most f the char cte sti eff t of hist min Th y d n t block th leas of h tamine b t ev dently do p eve t th hi tamine f om eacting o the d gan In ther p t doses th y exe t a d pr ant ffe t up n th C N S but in h gh r d th y h v n ta t eff t Th o d bl a i t o ffe t ness tol an ar d t x ty f m drug to drug nd f m indiv d al to di dual Compa bl th p ut d se of th v anth h t m s h ve o ghly simil t c ff ct

A <u>Exampl s f C mm ly U d A tih st m</u> Th s dr g ar giv n t d to q d in th foll w g do g
   1 S bstituted thyl n di nine d v tiv (>N C C N<)
      a T p l n m n <u>Hydr hlo de</u> U S P (Py b nzamin ®) 50 mg
      b Methapy l n Hyd o hl r d U S P (Th nyl ® Sem ko ®) 25 50 mg
      Th yl m ne Hyd hlor d U S P (Neoh tram ®) 25 100 mg
      d Py l m Male t U S P (N nt ga ® Stang n®) 25 50 mg
   2 Alk min ethe s (O C C N<) D ph nhyd m e Hydr hlorid U S P (<u>Benad yl</u>®) 25 50 mg
   3 Mis ll o mp und (C C C N) Chl ph ni ami Mal t e U S P (Chlor T m t n®) 2 4 mg

B <u>Cl c l I d t</u> The antih stamines m y b s d ff t vely n n al li g s t ia angioneu t ed m d ug t s s m s k s p u t s d to m ny form of d r mat t M d se e and m t sickne and a di t d to a l s te t in othe all gi tates (e g alle g thma d alle gi mig)

C <u>Toxi ty</u> Th ant hist m m y p od c d wsi est I a vou ss diz s n us a vom ting diar he m ular w akn s d y f m th bl red vis t mo and v n at t m s o vulsi

Chapter 4

DIETETICS AND NUTRITION

A diet must supply the following essential c mpon nts These *requirements* can be no mally m t by including the basi foodstuffs a outlined on page 47 (The d tary omponent are altered as in dicated for the needs of the individual)

A Calories for energy (supplied mainly by CHO intak)
B Prot in for growth devel pment tis ue repair and ne gy
C CHO fo energy and for prev ntion of ketosis
D Fat for ess ntial fatty a ds and energy
E Minerals and vitamins for maint nan of optim l tissue func tion and electrolyte equ librium
F Wate for *absorpti n t ansp rt of foods and waste products* and excretion

Modifying th Basi Diet

Per onal ating habit rac al and religiou restrictions ex *pens and geographic availabi.ity of food mu t be consid red in* the preparation of any diet Otherw s th ba ic diet must b modified as follows

A Inc ased All or p rt of th di t must b inc as d to comp n sate ith r f r inc as d a tivity o inc eas d metab l sm (as in thyrotoxi osis tiss e inju y and fever) (B M R is in crea ed 13% with ach 1 C 7% with each 1 F of f ver)
B Decr as d In ob sity the di t sh uld contain alories CHO and fat in de reased am unts
C R st icted Some dis as states require specific restrictions o var ations of o e or more of the basi dietary constit nt (e page 54)

PLANNING AND WRITING A DIET

Th planning and writing of a diet can b accompl hed by f llowing the steps numer t d below

Prescribing the Di t	Pag
1 Calcul t the aloric ne d of the patient	47
2 Include th b sic foods for a well balanc d diet	47
3 S lect the typ of diet to b empl yed	48
4 Calcul t the variation of th d tary component as *spe ifi d by the diet*	48

Selection of th Di t y Components and Ge e al Inst u tio	
5 Determine the p ot in needs and le t foods to be u d	49
6 S lect the ca bohydrate foods for the diet	51
7 Determine the fat requi ements and *di tary sources*	52
8 Determine the need for vitamin suppl m nts	52
9 Determine the ne d for mineral supplements	53
10 Arrange th number fr quen y and time of fe ding	53
11 Give d tail d instructions to the patient	53

STEP 1 – CALCULATE THE CALORIC NEEDS OF THE PATIENT

The calo   needs vary with age weight activity and nutrition al stat s (see b low) Th cal ric needs must be adj st d also to meet variations c   t d by disease or disorder (ee p ge 46)

APPROXIMATE DAILY CALORIC ALLOWANCES (N R C 1953)
Healthy pe ons 25 years of age U S A (mean temp 10° C 50° F)

Cal i for Standa d	Vary Calo ic Allowanc s as Follow
Men 65 Kg (143 lb)	W ight For each 5 kg ov standard
170 m (67 in)	add Men + 5% Wom n + 6%
3200 Cal rie	Fo ach 5 Kg under standard
Women 55 Kg (121 lb)	s bt M n – 6% Wom n – 9%
157 cm (62 in)	Temperat re (Average Environmental)
2300 Calo i s	For each 10° warm d e 5%
Pregnant 2700 Cal	For ach 10° cooler increas 5%
La t ting 3300 Cal	A t vity Vary to maintain w ght

STEP 2 – INCLUDE THE BASIC FOODS FOR A WELL-BALANCED DIET

The w ll balanc d di t hould alw ys includ   rving f th following food tuffs unless contraind cat d These basic foods must be k pt in mind while writing the di t and are conveniently used as the nucleus f f rmul ting most diets Th r mainder of the diet i mad up of increased quantiti   of foodstuffs from any of the groups The high CHO foods supply needed alo i f energy and ar the l t xpensiv

BASIC FOODSTUFFS

Foodstuff	B t Requir m nt	Weight o Volum †
High prot in Food		
M t fish o f wl or hee e o dri d	1 s ving	3 4 oz (90 120 Gm)
l gum	1 rving	1 oz (30 Gm)
Eggs	1 or 2	1½ 3 o (45 90 Gm)
Milk wh l	Adult 2 glasses	16 (480 cc)
	Child en 4 gla	32 oz (960 cc)
Wh l g ain (en i hed) c ls	1 serving	1 oz (30 Gm)
Bread	2 sli	2 oz (60 Gm)
V g tabl		
l root	1 serving	4 o (120 Gm)
l w l afy	1 s ving	2 oz (60 Gm)
l oth	1 s ving	3 (90 Gm)
Fruit		
1 f h (itrus t mato)	1 m dium iz d	3 oz (90 Gm)
1 oth r	1 ving	3 oz (90 Gm)
Fat		
B tt o f tifi d ma g in	2 tabl poon	1 oz (30 Gm)

Id al w ght (s ba k dsh t)
†Weight and 1 m f to th food tuff and not to the amounts of . CHO o f t they will yi ld

When preparing the food always make th servings attractive to sight taste and smell and serv at the proper temperatu e The best planned diet is useless unless eaten by the patient

STEP 3 - SELECT THE TYPE OF DIET TO BE EMPLOYED

After having calculated the basic caloric needs in Step 1 use the *following* table to help select the type of diet for th disease in question Descriptive details of these diets will be found on pages 54 to 59

THE PRINCIPAL TYPES OF DIETS

D sease or Disorder	Diet
Gastrointestinal	
Peptic ulcer	*Modified S ppy*
Functional disord rs	Bland (low residue soft consistency non stimulating)
Gallbladd r dis ase	Low fat and non g s forming
L ver disease	High prot in high CHO
Constip t on	*H gh r sidu*
Ca diovascular	
Congestive failure	Low sodium (salt)
Hypertension	Low sodium (less than 300 mg /d y)
Metabol c	
D abetes	Usu lly high protein with moderate CHO rest iction (see page 57)
Obesity	Low caloric adequate prot in
W ight lo s and malnutrition	High caloric high protein high vitamin
Renal	
Nephritis	Low but adequate protein 0 5 Cm /Kg (0 25 Gm /lb) body weight per day plus tot l albumin lo t *in urine*
All rg c	
Food all rgy	Sp ial elimination

Thes d ets vary in the numbe of alo ies and/or in the a mount of one or m e of th *di tary compon nts The n xt step is* to calculate these v riations

STEP 4 - CALCULATE THE VARIATION OF THE DIETARY COMPONENTS AS SPECIFIED BY THE DIET

After determining the basic caloric ne ds and selecting the type of diet use the following table to *calc l t the number of* calories and the amount of each dietary compone t fo th diet The *remainder* of the total calories not supplied by the fixed compon nts of the diet may be made up with unrestricted foods

VARIATIONS OF DIETARY COMPONENTS

C mpone t	A erage D et	High or Inc e sed	Low o D e s d
Calo s (Energy)	Va abl (s St p 1 p ge 4)	25 35% mo e lor s than f ma t nan	25 5% l calo ies than for m int nanc
Pr t in	1 Gm./Kg (0 5 Gm /lb) body wt./day (See Step 5 b low)	2 4 Gm /Kg (1 2 Gm./lb) body wt./d y (300 Gm s about pp r l m t)	0 5 Gm./Kg (0 25 Gm./lb) body wt./d y (S not below)
CHO	50% f alo ies as CHO	75% or mo e of alo s a CHO	About 25% of c l es a CHO
Fat	Ab t 100 Gm per d y	150 250 Gm p r d y	70 Gm or less p r day
V tamins	S ppl ed by w ll balan ed diet (s p ge 47)	Ir eas of h gh vitamin foods o suppl me t	Not indicat d
Mine al			
Sod um	5 20 Gm./d y	Ab ve 20 Gm./d y	0 2 2 0 Gm./d y
C l i m	0 1 1 5 Gm./day	Ab ve 3 Gm /d y	0 2 0 5 Gm /day

Not If l r a e abundant th p ot in m y g as low as 0 3 Gm /Kg (0 15 Gm./lb) body wt p day

H ving fo m lat d th d ta y p esc ption (St p 1 4) p pa e th a tual diet by el ting food tuffs from th t ble in St p 5 6 7 8 and 9 o th f llowing p g s

Th e food tuffs mu t not only p ovid the d si d diet y compone ts b t must lso be m d to fit the calori spe ificat ons Be *of the e y e senti l rol of prot n in the d t well* th highly v iabl f t content f the prot in food it ad bl to b gin th di t ry sel cti n with prot in food Th CHO fat and tot l alo a w ll a th prot in values of the v r ous food tuffs mu t be kept in mind

STEP 5 - DETERMINE THE PROTEIN NE.DS AND SELECT FOODS TO BE USED

Pr tein are ne essary fo g wth d velopm nt tis u ep and as a ur of en gy On Gm of p ot in 4 C lo s 100 Gm of p ot in du ing its atab li m may yi ld b ut 58 Gm CHO

RECOMMENDED DAILY PROTEIN ALLOWANCES (N R C 1953)

	Amount p r unit f body w ight	
1 Adol s nts	1 5 2 0 Gm /Kg	0 7 0 9 Gm /lb
2 Adults	1 0 Gm /Kg	0 5 Gm /lb
3 P egnant w m n	1 5 Gm /Kg	0 7 Gm /lb
4 L t ting wom n	2 0 Gm /Kg	0 9 Gm /lb

Mo t f the prot in qu me ts will b obt ined fr m high prot in foo-s which f rm th ba i f th p ot n int k l ula tion Afte det mining the amount of prot in n ed d fo th d t el t th high p t in f ods by th us of th tabl on the foll w ing p g

HIGH PROTEIN FOODS

These proteins are interchangeable in th diet One serving yields about 6 Gm of protein however the total caloric content varies

Food	S rving	Protein		CHO	Fat	Tot l
		Gm	Cal	Gm	Gm	C l*
Egg	1 small	6	24	0	6	75
Milk skimmed	1 c p or glass	6	24	10	0 6	65
Milk whole	(200 cc)	6	24	10	8	130
Lean meat or fish	1 o (fresh)	6	24	0	5	70
Fatty meat or fish	(30 Gm)	6	24	0	7	90
Fresh fowl	1 oz (30 Gm)	6	24	0	2	40
Cottage cheese	1 round d Tbsp.	6	24	1	0	30
Processed ch e e	1 slic (1 o .)	6	24	0.5	8	100
Fre h soy beans	1/4 cup	6	24	2	3	60
Other legumes	1/2 cup	6	24	1 5	1	100
Nuts	1 oz	6	24	2	16	200

RELATIVE PROTEIN VALUES OF PROTEIN PORTION OF DIETS

Diets of more than 70 Gm or less than 40 Gm of prot in can be calculated by either adding or dividing th se bas portions The table below is so arranged that proteins for low caloric (low fat) and normal or high caloric diets can be selected

PROTEIN PORTIONS OF DIETS

For Low caloric (Low fat) Diet	Cal.	For Norm l or High calori Diet	Cal.
Yields 40 Gm or 160 Cal Protein			
1 Egg	75	1 Egg	75
2 Cups skim milk (400 cc)	130	2 Cups whole milk (400 cc)	260
3 1/2 oz me t (lean)	245	3 1/2 oz meat (med fat)	315
	4 0		650
Yields 50 Gm or 200 Cal Protein			
1 Egg	75	1 Egg	75
2 Cups skim milk (400 c)	130	2 Cups whole milk (400 cc)	260
2 Tbsp cottag cheese	60	2 Tb p cottage hee e	60
3 1/2 oz m at (le n)	245	3 1/2 oz me t (m d fat)	315
	510		710
Yields 60 Gm or 240 Cal Protein			
1 Egg	75	1 Egg	75
2 Cups skim milk (400 cc)	130	2 Cups wh le milk (400 cc)	260
1/2 Cup cottage ch ese	240	1/2 Cup cottage he se	240
3 1/2 oz meat (lean)	245	3 1/2 oz m at (med fat)	315
	690		890
Yields 70 Gm or 80 Cal Protein			
1 Egg	75	1 Egg	75
2 Cups skim milk (400 cc)	130	2 Cups whol milk (400 cc)	260
1/2 Cup cottage cheese	240	1/2 Cup cottage che se	240
5 oz meat (lean)	350	5 oz meat (med fat)	450
	795		1025

*Total calories represent the calo i value derived f om the carbohydrate fat and protein cont nt of the foods listed

ST..P 6 – SELEC" TH: CARBOHYDRATE FOODS FOR THE DIET

Ca bohydr t s upply nergy and usually con titute the la gest part of the di t (about 50%) One Gm of CHO 4 Cal If d qu te CHO ar giv th proteins are spar d as s ur es of en rgy At l ast 10 15% f the di t mu t be CHO to p ev nt k tosis

A Fo rough approxim tion of the CHO cont nt of foods the following f gu es will suff c An av r ge serving is app o i mately 1/2 cup ook d or 1 cup aw v g tabl s or fruits

Av ge Serving	Amount of CHO	Tot l C lo ie
V getable	4 8 Gm	25
Fruit	12 15 Gm	50
Sli e b ead potatoes c rn beans c eals	15 20 Gm	75

B Fo close app oximation of the CHO ontent of food

1 5% v get bles and fruits 100 Gm port on yields 3 7 Gm CHO 1 Gm protein and app oximat ly 5 Calories

A p ragus (8 st lks)	Cucumb r (20 sli es)	Spin ch (1 c)
B mbo shoots (3/4 c)	Egg plant (2 sli e)	St ing bean (1 c)
B an sp outs (1)	End v (1 h ad)	Summ r squash (1)
Be t gre (1 c)	Lettu (1/3 b ad)	Tom to (1 small)
B occoli (1 c)	Musta d green (1 c)	Tu nip greens (1 c)
Cabb g (1 1/2)	Okr (10 pod)	Cant loupe (1/4)
Cauliflow (1)	P pper gre n (1)	Rhubarb (1)
Cel y (5 stalks)	R dish (15)	St wb r i s (12)
Ch rd (1 1/2 c)	Sau kraut (2/3 c)	Wat melon (1/2 sli e)

2 10% veg t bl and fruits 100 Gm po ti n yields 8 12 Gm CHO 1 Gm p ot in and app ximat ly 40 Calor

Artich k (1)	Onions (2)	Gooseb i s (2/3 c)
B et (2/3)	Pumpkin (1/2 c)	G p fru t (1/2 c j)
C rots (1 la ge)	R t bag (3/4)	Honeydew melon (1/10)
Dand li n greens (1 c)	Whit tu nip (3/4)	Orang (1 jc)
G n bean (1)	Winter sq sh (1)	P ach (1 larg)
L k (4 talk)	C anb rries (1)	Ta g in s (2)

3 15% g tabl s and fru t (fr h or ann d without uga) 100 Gm portion yi lds 12 17 Gm CHO 1 Gm p ot in and app oxim tely 50 Cal r s

Appl (1 m d)	Cu nts (1)	Peas (3/4)
Apri ots (2)	G p (1 c)	Pineappl (2 sli)
Bl kb i s (1)	Loganb r es (1)	Plum (3)
Bl b i (2/3)	N t in (2)	Ra pbe es (1)
Ch r s (18)	P ar (1)	

4 H gh CHO f od S ving yi lds pp im tely 75 100 C l

1/2 up of al m a n l gum o n (ls yi ld 3 5 Gm p tein)

b 1/2 cup of p nip and potatoe (also yi lds 1 Gm p ot in) 1 slic of b ad (lso yi ld 2 Gm prot in)

d C k rs qui lent (also yields 2 Gm p ot in) 4 od 3 g h m, 5 p tz ls 3 Ry k isp®

D i d fru t 1/4 p i in 3 o 4 l rg p e or dat 1 2 1 g figs (al o yield 1 Gm p ot in)

f S ga 3 b o 2 heaping t spoonful

C B e g (Cal /30 cc) (For milk see page 50) Black coffee 1 tea 0 ginger ale 12 beer 12 other carbonated be e ag s 15 dry win 25 sweet wi e 40 liq ors 75 (Calo ic values for be r wine and liquo s are derived mainly from alcohol)

STEP 7 – DETERMI E THE FAT REQUIREME TS AND THE DIETARY SOURCES

The requi em nts for fat a e not known but fat forms an impor tant sou e of f od 1 Gm fat 9 Cal Fats us ally make p the remai d r of the c lo ntake afte protein and CHO portions ha e been selected M t protein containing foods contain fat also thi must b cal ulated in det rm ning total fat intake (see page 50)

The role of e ent al (nsat rated) fatty acids has recently b en reemphasi ed It has be shown that using 50 150 Gm per day of o l nta ning high co centr t ons of esse tial fatty acids pl sma choleste ol an be lowe ed The e act amou ts of esse tial fatty acid n d d a d the r precise rol in human nutritio or human d eas are t ll u d termi ed Howe er the average diet should probably ntain es t al fatty acids in adeq ate amo nts Some of the ommon ed ble oils and th r ave age esse tial fatty acid (lin oleic acid) ontent ar as follows safflow r oil 70% corn oil 42% cottonse d oil 45% oy o l 54% olive o l 7%

Caloric V l s of S rv gs of I r Fats

Ea h of th followi g q als bout 40 Calories 1 t p butter 1 tsp lard 1 t p ma ga e 1 tsp mayon ai e 1 tsp animal fat 1 Tb p l ght ream 1 tsp oil 1 strip baco (One sq are p t of b tt or ma ga ne eq al 80 100 Calories)

STEP 8 – DETERMI E THE NEED FOR VITAMI I SUPPLEME TS

Th normal daily qu em ts are adequately upplied by the b s c diet shown on page 47 It s o ly in cases of r stricted diet or b orm l metabol stat s (e g di betes fe e s thyrotoxi cos dig st ve ab orption et) th t vitamin suppl ments may be necessary For the apeuti dosages s e pages 60 to 64

DAILY ALLOWANCES OF VITAMINS (N R C 1953)

Vitam n and Da ly R quirem nt	Natu al Sources
A 5 000 8 000 I U	V tamin A Milk butter and li r oil Carotene pre urso s Ca rots swe t pot toes ap icot spi h thin gre n l av d vegetable
B_1 Th amin 1 2 1 6 mg	Ye st m t wh l g ain r al b an live gg yolk
B_2 R boflav n 1 4 2 5 mg	Milk y a t ggs li e m t
P P Ni cin 10 16 mg	L er ye st m t bran whol wh at
C A o b A d 70 150 mg	C t s fr ts g e p pp r p l y tomato s cabbage radi h s
D 400 U t	B tte liver y lk fish li r oil

STEP 9 – DETERMINE THE FIELD FOR MINERAL SUPPLEMENTS

D ily equi ements of the minerals a e supplied in a well balanced di t (see page 47) Additional amo nt are r qui ed when an bnorm l lo or increased demand ar es the given min al i s lly th n pr acr b d as a drug The 2 d ficie es m st likely t occur are th of lci m nd ir n Iodin def iency in en d m s e s an be pr vented f iod d salt is used

DAILY ALLOWANCES OF MINERALS (N R C 1953)

Mi al	Allow nces	N tu l Sou es
Miner ls mo t pt to b def c nt		
Calc um	0 8 Gm fo ad lts 1.5 2 Gm f r p gnant a d lact ting wom n	Milk and m lk prod cts (1 Gm cal um/qt)
Ir	12 15 mg fo hild n menst uating women Less n m n d infa ts	L v r gg y lk kid y b f wh l wh t gr en veg t bles
Min al l t pt to be d f e t		
C pp	1 2 mg	Liver gg yolk bran o tm l
I din	0 12 0 3 mg	I diz d salt Veg tabl g ow in iod n ich soil
Sod m	2 5 Gm	T bl salt m lk m at eggs
Pho pho us	1 1 5 Gm (2 5 3 Gm d ng p egnancy)	Milk l ve egg yolk cereals nut b ans
P t ss um	1 4 Gm	All g t bles and fr t

STEP 10 ARRANGE THE NUMBER FREQUENCY AND TIME OF FEEDING

In th man gement of ert in d s s t may b com n s ry t giv a g ter n mb r of la g m lle f d g sp c d at gul int ls o e th gre ter port n of the day The cond t on in whi h th ar mportant includ

1. Malnut tion f ver thyroto o is inju y Fr quent g n us f d ng to in e d t ry ntake
2. P pt ul F equ nt sm ll f d ng to maint in c nstant buffe i g t on
3. D b t Fr que t m ll f d gs to m i t in mo o st t blood ug
4. De r a ed g t c pa ty (e g po t g t ctomy) F q nt m ll f dings

STEP 11 – GIVE DETAILED INSTRUCTIONS TO THE PATIENT

Wh th di t h b n ompl t ly plann d ar f lly xplain d d f lly w tt n in tru t s m t b g v n to th p t nt Th s hould i lud mpo ition s f f dings numb of m al and t m f ting Th foll wing d ption of th di ts will id in f mulating th stru ti s

PRINCIPAL TYPES OF DIETS

The following diets are plann d around the Bas c Foods which form the nucleus of a well balanced d t See tabl on page 47

Sippy Diets

P ogr ssive non ritating buffering diets taken on regular schedule

Composition

- Stage I 3 oz (90 cc) half milk and half cream (18%) every hour from 7 00 a m to 7 00 p m
- Stage II *Stag I plus 3 feedings of refined cereal (3 pe serving)* and 1 soft cooked gg t i d
- Stag III Stag II plus creamed soups and pureed veg table
- Stage IV 3 (90 cc) milk and cream every h ur plus r gu lar meal of small feedings of l an meat potato pure d v getabl refined reals and breads custard pudd ngs cr am and b tter

Restri t ons Me t extracts bran raw vegetable and fru ts tea ffee cond ments p es alc hol and a bon t d beverages

M uleng a ht s Diet

Employed n bleeding p ptic ul s As now generally mploy d means fr quent f edings of pur ed f ods Or ginally describ d as follows

- 6 a m T a white bread and butt
- 9 a m Oatmeal w th milk whit bre d and butt
- 1 p m Dinner A mu h as d red of meat b lls broil d chops omel t f sh b lls vegetable r m at or fi h gratin ma hed potatoe vegetabl pu e or soups r amed get bl s st w d ap ots appl sauce gruel and r ce nd tapio a puddings
- 3 p m Cocoa
- 6 p m Wh te b ad nd butt r sl ed meats heese and t a

Bland Di t

A n mal d t mod fied to be sm th non ritati g and bland in t ste May lso be us d as l w r due di t

Compo t o L an meats fish poultry gg milk pot to pu eed vegetable and fruit r fined c e ls and bread cus tards puddings g latin de serts cre m butt r m garin s lt and sugar in mod ration

Re tri tion Fried food raw veg tabl s fru ts nd fruit juices sp ce condim nt bran whol grain cereals and bread c bonated bev rag s lcoh l and coff e

Low f t No ga fo mi g D t

Compo tio Lean meat f h poult y skimm d milk o b tter m lk cott ge che e cereal products bre d veg tables and fruits xcept thos li ted below gelatin dess rts sherb t pudding without cream sug rs and jelli s

Restrictions Pork ham bacon fatty cuts of any me t cr m c bb ge family onions turnip cucumber radishe gre n pepp rs d ied beans and p s m lons raw apples butter m rgarine mayonnais oil nuts chocolate fried foods pastries and highly s ason d foods

H gh prot i High CHO Low fat D t

C mpo t A l w fat d t w th t ess placed o la ge se ings of l an m t gg kimmed milk o buttermilk cottag che se c al b ads f uit jui sug r and jelly To c l cul te a d f nite amount of p ot in fo thi diet see tabl s on p ge 50

R strictions. S m s f r low f t non g s forming di t

High resid e D et

A normal diet with a maximum of bulk

Comp iti All of th ba i foods with ext rvings of whole gr in ls and breads r w egetabl a d fruits a d an *adequate* mount of fluids

R tri tion Non

Di t R t ict d in Sod um Cont nt

S d um r st t d diets u u lly mploy 1 5 Gm of sod um (3 75 Gm od um chl de) or und r Fo best th peutic r sult diets should conta n less th n 600 mg of sod um (1 5 Gm sod m hlo d)

Th f llowing tw low sod um diets both cont in 2 000 C lories Th y r th sam n comp sition c pt for the beverag

250 mg sod um di t u e Lonala ® a bev g
500 mg sod um diet us wh le milk a bever g

Bre kf t

Fru t	½ c p
S lt f e co k d r puff d c al	½ c p
Salt f ee b d	1 slice
S lt f e b tt m g in	2 t p (1 pat)
Egg	1
Lon l c® or whol milk	½ p

Noo and E ning M ls

S lt f e f sh m t	3½ o
S lt f e pot to o i	½ up
Salt f e o ked o r w veget bles	as d ir d
S lt f bre d	1 slice
S lt f e butte or ma g ine	2 tsp (1 p t)
F u t	½ up
L al c® or whole milk	8 oz

A Inst tion (S Rest t on on Foll w g P g)

1 Lo al ® is p p r d by m ing ½ up d y p wd w th 2 ups of w t th s m y b fl o d with ho lat
2 T m k lt fr m g in w h and knead m g in in fiv hange of old w t
3 U f h o f oz n v g t bl sp l lt fr nn d g t bl M y us rt h ke be t ots pin h and oth g twi w ekly
4 U nly f h o k d f u t
5 U o ly granul t d g l tin in salad and d t
6 M y u e p pp h bs and othe spi
7 M y u one of th od m f salt ub titut s

B Restrictions
1 Ham bacon bacon fat salt pork corned beef or pork luncheon meats canned meats fish or poultry
2 Prepared c reals with salt quick cooking cereals breads leavened with baking powder or baking soda
3 Prepared foods or prepared desserts
4 Canned vegetables dried fru ts commercial salad dr ss ings catsup
5 Salted nuts salted popcorn potato chips
6 Garlic salt onion salt celery salt salt baking powder baking soda
7 Celery olives pickles r l shes chard
8 To avoid distention Cabbag family onions turn ps pep p rs dried bean ucumbers sweet potatoes raw apples melons

C Approximate Sodium Content of Common Foods (in mg per ser ing) Th s list giv s the natural content without the add t on of salt bak ng powder or baking soda
1 Fr sh meat fish and poultry 3½ oz (100 Gm) serving

Lamb	78 98	Oyster	73	Ch ken leg	110
Pork	59	Cod fish	60	Turkey l g	92
Beef	51	H l but	56	Ch ck n br ast	78
Veal	48	Salmon	48	Turkey br a t	40

2 Egg (1) 40
3 Milk 7 oz glass (200 cc) Cultured buttermilk 270 fr sh whole milk 110 re onst tuted whole milk (Lon lac®) 3
4 Cheese 1 oz (30 Gm) Process d 450 heddar 210 cottage 100 r m 75
5 L gumes ½ up (4 oz or 120 Gm) fresh or ⅛ cup (1 oz or 30 Gm) dry B ans and corn 0 1 1 split p s dry 42
6 C r als 1 oz (30 Gm) dry ¼ up whol grain r als or pastes (macar ni tc) 0 5 4 l up dry c ld ere ls 200 350 puffed ere ls 1
7 Bread (1 sli e) and crackers
Commerc l bread 160 250 8 S da cra kers 330
Yeast bread without salt 0 5 1 Mat oth plain 0 3
8 V g tables 3½ oz (100 Gm) s rving of fresh or froz n (not canned) (For siz of s rving s e pag 51)

Arti hok	43	Cabb g	5	End	18	P t to	
Aspar gus	2	Carrots	31	Kal	110	skin! s	0 6
B ans	1 2	Cauliflower	34	Lettuc	12	Pumpk n	0 4
frozen	2	Chard	200	Okra pods	1	Spin ch	82
Be ts	110	C lery	110	Onion	1	Squ sh	0 5
Broccoli	16	C rn	trace	P rsnips	7	Tomat	3
Brussels		froz n	9	P s	0 9	Turnip	37
sprouts	16	Egg plant	1	fr z n	100		

9 Fruits 3½ oz (100 Gm) serving (f r s ze see pag 51)
Fresh cann d and froz n fru ts c nta n le s than 10 mg sod um p r serving
10 Fats 10 Gm (2 tea poons)
Margarine 110 Swe t butter 0 5 Sh rt ning 0 1
Regular butter 98 Oil 0 2 Lard 0 3
11 Sweets 10 Gm (2 teaspoons)
Sugar minute amounts honey 2 0 jelly 0 2

1 Mis llaneous
B r 8 o 19 Coca Cola® 1 bottle 1 8
Gi g le 8 o 19 N ts 1 oz (30 Gm) 0 5
Coff tea natural h rbs and condim t ont in only gligibl amounts of sod um

Diab t c Di t

A lcul ted diet with gul t d amounts of protein fat and ca bohydr t

1800 Calo

B akfa t (7 00 9 00 a m)
1/2 cup 10% f u t
2 ggs any styl
1 tsp butt or ma g ine
1 gl kimm d m lk

M rning F eding (10 00 a m)
1 gl ss kimm d milk
1 in h cube pro d hees
round d Tbsp n ts

N M al (12 00 1 00 p m)
3 any l an meat
hick n or f h
1/2 cup 5% vegetabl
1/3 cup 5% v g t bl
S l d 5% veget bl
2 t p butt m rgarin
1/2 c p 10% f uit
1 gl s milk

Aft noon F ding (3 00 p m)
1 gl s kimm d m lk
1 ound d Tb p nuts
p anut butt

E ning M l (6 00 7 00 p m)
3 any l an m at
hi k n o fish
1/2 cup 5% v g table
1/3 p 5% v getable
S l d 5% v getabl
2 t p butt marg in
1/2 up 10% f u t
1 gl m lk

B d Tim F ding (9 00 10 00 p m)
1 glas kimm d milk
1/2 up (ant) cottage h s

2500 C lo ie

B kf t (7 00 9 00 a m)
1/2 up 10% fruit
2 gg any tyle
2 strips bacon (i p)
Coffee or tea as d sir d

M n ng Fe d ng (10 00 a m)
1 up whole milk
2 1 in h ube processed heese or 1/3 up peanuts

N on M l (12 00 1 00 p m)
1/2 c p c tt g heese
1/2 up 5% v g t bl
1/2 p 10% veget ble
1/2 cup 10% fruit
2 t p butter or ma g rin
1 cup wh l milk
Coff o tea a d ir d

Aft n on F ding (3 00 p m)
1 up whol milk
2 1 in h cubes p oc ssed ch s r 1/3 cup p an t

Ev ning Meal (6 00 7 00 p m)
4 l an meat chi k n fi h
1/2 p 5% v g table
1/2 cup 10% veg t bl
1/2 up 10% f u t
2 t p butter o margarin
1 up skimmed milk
Coff e t a as d ired

B d Tim F ding (9 00 10 00 p m)
1 up whole milk
2 1 in h ub p oc d hee o 1/3 up peanut

High calorie High p t High vitam Diet

A normal diet cont n ng extra foods high in prote n and all of the vitami

Composition All of the basic foods with increased amo ts of meat f sh po ltry li er eggs m lk chees whol grain cere ls carrots green vegetabl s citrus fr it butte or marg rine (see table on pag 58 fo h gh protein foods and table on page 52 fo h gh vitamin foods)

R stricti s None

Low calo D ets

B lky diets containing adequate p otei which a low r in calories th n the patient s daily requirem t (see page 47) The amount of food listed in ea h d et is th total daily intake

1200 Calorie D t

5 oz meat f sh poult y or cheese
1 egg
1 pt skimmed milk or butterm lk
1 slice bread
1 serving (½ cup) potato o equ vale t
2 servings 10% veget bl s
3 4 servings 5% get bl
2 servings 10% fresh fruit
1 serving 15% fresh fru t
2 tsp butt r or marg n

1000 Calor e Diet

Omit the f ll wing from the 1200 C lorie d et
1 serving potat
1 servi g 10% getable
1 erving 5% veg tabl
1 tsp butt

800 Calorie D t

3 oz lean meat f h or poult y
2 oz cottag chee
1 sl bread
1 se ving 10% veget ble
3 servings 5% veget bles
3 rvings 10% fruit
1 pt skimmed milk o butt milk

1500 Calo D et

Add the f llowing to the 1200 Calori d et
2 sl c s br ad
3 t p butte or ma ga
1 ving 15% fruit

R st iction All foods c ndy and be r g e cept those l ted

Low p ot Di t

A no m l d t with th protei fo ds limit d to th mi imum b t adeq t amo nt

Sp cial El m ati n D ts

A ormal d t ontaining no foods su p cted of c us ng alle gic eactio s S ch reactions re p od d most f quently b wheat eggs a d milk less fr que tly by citru ts hocol te d fi h Other foods may infreq ntly c se r t s

More spe ialized d ts hav be n pr pa ed by lle gists a d are used both diagno tically and therap utic lly Con lt books n allergy for th diets

L w purin D t
Diet low l prot s
Food Fo bidd n Liver kidn y sweetb ads sardines n hovi s b ains whol g ain products g avy s up meat extra t es asparagus bean caul flower pe s l ntils and mush o ms
Food Rest i ted All other m at fish and fowl
Compo t o All oth f ods are allow d Most protein to be d r ed fr m eggs and dai y products

TUBE FEEDINGS

Tube feeding a mploy d when patient is unabl o u will ng t take food by mo th A venie t me ns of adm ni t ing the fe ding is with a m ll polyethyl n tube passed i t a sally Many food m tu es m y be given th nly equi ements ar th t the food be flu d o in a s pe sion of v y m ll particles

Prot in hydroly tes are oft n irrit ting Fo mul cont ining egg t d to oc lude th lumina of sm ll t bes Exc ll nt f mulas an be p ep ed by using milk (occasionally lot in tube) cal ium c inat Lon l c® tr ined m at l tos u o e o glucos F ts uch s s l d o l m y b add d if em lsif ed with Tw en 80® a s mila gent Vitami d min rals re add d s ind ted E ampl f t be f ding fo mul s e as f ll w

1 L w l f m high p ot n di t Suppl 3 000 C l l s per 3 000 c (l C l /) ontains 133 Gm prot in

St ined ned b by me t	400 Gm (4 cans)
Tomato juice	1900 c
Prun j l	90 c
All purp e Soyal ®	200 Gm
La t	315 Gm (1¹⁄₃ cup)
W t r q d	3000 c

2 l exp i e h gh p ot in fo mula 3 000 C lo pe 3 000 c (l C l /) nt in 120 Gm p t in

Hom g i d m lk	2200
½ m lk a d ½ am	600 c
Eggs	6
D xt i M lt s ® o lact	7 Tb p

3 Low sod um h gh p tein f m la 3 000 C lor pe 3 000 o t ns 150 Gm p tein 78 mg d m

Lo l ®	600 Gm
Wat q d	3000 c

THE VITAMINS

Th itami org sub tan s ti l f lif whi h m t b ppl d t the o g i m f m e ge o o r e Th y a t min b t pp a t f t as n ym or e ymes in impo t t m t b l p o s Th b t s of vitamins w ll b lan ed d t A h lthy p with p p ut tion doe ot eq i v tam ppl m t ltho gh m y p do t t ff ie t vit mi ont n g f ds f r optm l h lth

H gh alo e H gh p ot in High itamin Diet

A normal di t ontain ng extra foods high in prote n and all of th v tam ns

Composition All of the basic foods with increased amounts of me t f h poultry live eggs milk cheese whole grain c r als carrots gre n v getables citrus fr its butter or ma g r ne (see tabl on page 58 for high protein foods and tabl on page 52 for h gh vitamin foods)

R str ctions None

Low calorie D et

Bulky d ts containing adequate protein which are lower in alories than th patient s daily requirement (s e page 47) The amount of food li ted in e ch d et is the total daily intake

1200 Calorie Diet

5 o m at fish po ltry or chees
1 egg
1 pt skimm d milk o butterm lk
1 sli e bre d
1 serving (1/2 cup) potato o equiv lent
2 servings 10% veget bl s
3 4 se ings 5% veget bl s
2 s ving 10% fr sh fru t
1 servir g 15% fresh f it
2 tsp butter o m rgari e

1000 C lorie D t

Omit the following f m the 1200 C lo e d t
1 s rving potato 1 rving 5% eg tabl
1 rving 10% v g t ble 1 tsp butt

800 Calo ie Di t

3 oz lean me t fish or poultry
2 oz cottage cheese
1 sl ce bread
1 serving 10% veg table
3 ser ings 5% veg tabl s
3 servings 10% fruit
1 pt skimmed milk or buttermilk

1500 Calorie D t

Add the followi g to the 1200 Calorie di t
2 sli s bre d
3 tsp butter o m rgari
1 ving 15% f uit

R st t on All f ods c ndy and be er g s except th se li t d

Low prot n Di t

A o mal d t with th protein foods limit d to th minimum but adequat m nt

Sp i l El m t on D et

A n rm l d t co ta ning o foods spe ted of sing all g rea tio Such re t o s a e p odu d m t freq e tly by wh at gg nd m lk l s freq e tly by cit s n ts hocol te d fish Other foods may nf q tly au r actio s

Mo specialized d ts hav be n p pa ed by all gists and are used both diagno tic lly and ther p tically Co lt bo ks n all rgy f r th se diets

Avit mi s D (Cod No 010 764)

Av tam si D is usually due t i deq te d t ry i take la k of sunlight or ab orption defect

A Cli l Fi d gs Lack of vitamin D l ds to o te m la ia l hild th is k own a ick t (se page 380)

B T sts f D f ci y S um calcium a d pho phorus may be n m l or d re ed a d alkal n pho phatas is g e ally in cr s d L ina y cal i m ex etion i decr sed

C T tm nt See O teomalacia p ge 380

VITAMIN E

Vitami E pl ys a role in norm l phy iology of some an mals b t th e i no good viden e of its a tivity in man It is elatively to ic It has b us d without app e it ben f t i some ca es of hab t l abo t vari ne r m ular sy dromes a d h t d eas i dos of 50 100 mg α tocopherol daily

VITAMIN K

Th vitamins K a e ch mical ompo nd nec ary for p thr mb synth s by the l v a d o a impo t t in th blood c gul tio me han m They a e w d ly d t ibut d i gr n l av f pla t gg yolk a d s ybea Th y e also ynth i d by mi oo ga sm in the t st n All w n a e n t k ow

A t mi K (Code N 010 766)

A itami K its f om l ver d ea i t f g with syn th i of p th mb dequ t b l pply w th poo ab orption dr g dep ess g p thr mb n synth i (ouma n sali yl t)

A M f t tio Ble d g f m mu us m mb o t a ma

B T ts f D f ci y P olong d p oth omb t me

C T tm t

1 F t tm nt f li di e s pp 279 287
2 F t tme t f Di um ol® t x ty s pag 216
3 Preg t wom n g lly h uld ec ve 2 5 mg M d o S d um B sulf t I j ction U S P (M aphth e I j tio B P) I V I M 1 72 hou b for d l v y t p e t ble d g n wb n infa t

WATER SOLUBLE VITAMINS

VITAMIN B COMPLEX

Th memb of the vit mi B c mpl x a e e y intimately c at d o e a w ll i funct n A a sult f th s l t l t sh p it i doubtf l th t a d fic cy of si gl B vitam v st ex ept und r xp rim nt l d tio Def ie of a gl m mb of th B o npl x w uld l d t impa d m t boli m of th oth H although c tain clini l f atur s m y p domi t i th b n f si gl m mbe of the mpl x thi d n t ignify th t th d fi cy an b t r ly o r ted by dmi t ing th t ingl fa to Th r fo spe if the py

In illness there may be considerabl variation in the body re quirements depending upon age activity diet metabolic rate and other f tors affecting the absorption, utilization and xcretion of vitamins Vitamin deficiencies are almost always multiple p rticu larly of fat soluble or B complex vitamins as a group Early signs of vitamin defic ency are usually nonspecific v gue and mild and are eas ly misinterpreted o missed entirely The crude sources of the vitamins are oft n more efficacious in therapy than the pure or synthetic Only during the mo e severe phases of the defic nci s is it usually necessary to resort to the use of p re vitamins The us of a pure vitamin in the face of a true multiple vitamin de ficiency m y aggravate rath r th n help the condition Treatme t of vitamin defic enc es requires an adequate balanced high protein and high vitamin diet in add tion to n cessary vitamin supplements In gene al it is wis to use vitamins therapeutic lly in 5 10 tim s the amount r quired for daily maintena ce

FAT-SOLUBLE VITAMINS

VITAMIN A

Vitamin A is an alcohol of high molecula weight which is con ve t d f om β- arotene in foods by the liver It is necessary for *normal fun tion anc st u t res of all epithelial cells a d for synthe s of visual pu ple in retinal rods (he ce fo vision in dim light)* It is pre nt in leafy g een and yellow fruits and vegetables whole milk butt r eggs R commended daily allowa ces for ad lts a e 5000 I U (o U S P un ts) du i g pregnancy and lactation 6000 to 8000 I U Toxicity 500 000 to 1 000 000 I U daily may cause alopecia tching and bone pa n from periosteal proliferatio

A tamin s s A (Code No 010 761)

A Mild or Early Manife t tions Dryness of th skin night blind nes and follicular hype k ratosis

B Sever o Late Manif stat s Xerophth lmia atrophy and k ratini at on of the kin and keratomalacia

C T sts fo D f ien y Dark adaptati n is impaired Low blood v l s of oten vitami A may be h lpful or a the peuti te t with 25 000 to 75 000 I U daily f r 4 we ks

D Tr atm nt *Ol ovitamin A U S P Vitamin A B P 15 000* to 25 000 I U o ce o twice daily If absorption defe t is pre nt it may be n cess ry to admini ter bile salts with the vitamin A or to giv the ame do age in oil I M (50 000 nits/ cc in sesam oil) Skin lesions may requi e mo e t atme t

VITAMIN D

The vitamin D are sterols formed in the animal body by lt a violet i adi tion of plant sterol precurso s They increa alcium absorption f om the inte tine and urinary pho phorus ex retio They are prese t i fish livers their p ecu sors a e widely dis tribut d in plants Allowan es for adults a not k own Fo *childre* and during pregnancy and lact tio 400 I U (or U S P units) are recomm nded Toxicity 150 000 I U o more daily causes elevated serum calcium with met static calcification

Avitamin sis D (Cod No 010 764)

Av taminosi D is usually d e to inad quate diet ry i take lack of nlight o absorpt on def ct

A Cl ical Fi ding I ack of vitamin D leads to o teom l cia I childre this is kn wn s icket (see p ge 380)

B T e for D f cy S um calci m a d phospho u may b no mal o dec e s d nd alkaline phosphatase is ge erally i cr as d U inary alci m xc ti n s d creased

C Tr a m t Se Osteomal c a pag 380

VITAMIN E

V tamin E plays r l i no mal physiology of som animals b t her no g od eviden e of its a t vity in man It is relativ ly o tox It has be n u ed w thout ppa ent b efit in some a es of h b t l abo tion va io s neu omu cul r syndromes and h art d s ase n do s of 50 100 mg α t cophe ol daily

VITAMIN K

The v tam s K e ch mical mp ds e sa y fo p o th mbin ynth s s by th l r a d so ar impo tant th blood c agul ti me h m Th y ar widely d stribut d i gr e lea e f plant egg y lk a d soyb ans Th y a e also synthesi ed by mi o rga isms in th i te t es Allowan e a e n t k own

A it m k (Cod No 010 766)

A tam o s K It f om li er d se int rfering with syn th s of p oth ombin ad q ate bile pply with po abs rptio o d g d pre i g p thr mb ynthe is (c a rins sali ylate)

A M f t t Ble d g f m m o s m mbrane o tra ma

B T st f r D f c y Pr l nged p oth ombin time

C T tme t

1 F t atme t f l v dis s e pp 279 287

2 F t tm t f D cum rol® t x ity see p g 216

3 P egnant w me g e ally sh ld r ive 2 5 mg M dio s d m B lfit I j ction U S P (M naphtho Inj ct B P) I V or I M 12 72 hours bef re d l v y t p v t bl eding i n wbo n inf ts

WATER-SOLUBLE VITAMINS

VITAMIN B COMPLEX

Th m mbe s of th vitami B omplex e ve y i timat ly sso i t d u r ce s w ll s i fun ti n A a r sult of this l s t l t h p it is doubtf l that a defi y of singl B itam iste ex pt und r xp m t l c diti ns D f ie y of i gle memb r f the B omple would l ad t impai d m t bol m f th th H e lth gh e t in lini al f tu e may p do i te i the b of i gl m mb f th mpl x thi do s ot signify that th d f y an b nti ly t d by admi t ing th t singl f to Th fo p if th apy

must always be supplied in the presence of adequate (dietary or parenteral) sources of all of the other members of the B complex Water sol ble vitamins should be administered in di ided doses throughout the day to pre ent ex essive loss in the urine

VITAMIN B_1 (Thiamine Hydrochloride)

Vitamin B_1 is the coenzyme for decarboxylation of α keto acids (*e g pyruvic α ketoglutaric*) *It is important therefore for normal* carbohydrate oxid tion Dietary sources are liv r lean pork kid ney and whole grain ereals Steaming or exposure to mo st heat reduces the thiamine content of foods Daily dietary allowances are about 0 5 mg per 1000 Calories (avg 1 2 1 6 mg per day)

Avitamino is B_1 (Beriberi) (Code No 010 7621)

Avitaminosis B_1 results from an inadequate intake due usually to idiosyncrasies of diet or excessi e cooking or processing of foods The increased need for vitamin B_1 during fever high CHO intake or thyrotoxicosis may le d to a d f ciency

A Mild or Early Manifestatiors Vague multiple complaints sug g st ne rasthe a and include anorexia formi tion and m s cle cramps tenderness of calves pareathe as and hyper activity followed later by hypoactivity of knee and ankle jerks

B S vere or I ate Manifestat ons (Beriberi) Severe anorexia polyn ur tis serous effusions subcutaneous edema paralyses (parti ul rly in ext emities) and ardiac insufficie cy mani fested by tachyc rdia dyspnea edema and normal or de creased irculation time elevated venous pressure and non specifi Ecg changes

C Treatme t

1 Thi mine Hydrochloride U S P (Aneurin Hydro hloride B P) 20 50 mg orally I V o I M d ily in divid d doses for 2 weeks then 10 mg daily orally
2 Dried Y ast Tablets U S P (brewer s yeast) 30 Gm t i d
3 Well balanc d (2500 4500 Calori s) diet when tol rated

VITAMIN B_2 (Riboflavin)

Riboflavin serves as coenzyme for hyd ogen transf r It is present in milk and milk produ ts leafy gree vegetables and liv r *Daily dietary allowan es for adults are 1 4 1 8 mg in* p egnancy and lactation 2 2 5 mg

Avitamino is B_2 (Ariboflavino is) (Code No 010 7622)

The tiological fa tors of ariboflavino is a e simila to those of thiamine deficiency but inad quate intake of milk is important The manif tations of deficiency usually o cur along with thiamin and niacin deficiency b t may occ r earlier

A Mild or Early Manifestation Oral p lior superficial fissur ing at angl s of mouth onjunctivitis and photophobia lack of vigor malaise weakness and weight lo s

B Sev e or L t M nif statio s Cheilosis (fissuri g at th angles of the mo th) fissuring of the nares magenta tongue

with m de te dem dysph gia cor eal vascula iz t o and ir um or eal inj tion and ebo rheic dermatitis

C T eatm t

1 R boflavin U S P B P 40 50 mg I V I M o c ally d ily unt l all ymptoms have leared

2 Dried Yeast Tablet U S P (b ewe s yeast) 30 Gm t i d

3 Well balan ed (2500 4500 Calo ies) diet when tolerated

NICOTINIC ACID (Niacin) AND NICOTINAMIDE (Niacinamide)

N cin and ni cinamide fun tion in impo tant en yme sy tems c cer ed with rever ibl oxidation and red tion They are pres ent in l r y st meat whol grain er als and peanuts Daily allowance f r adults a 10 18 mg fo adoles ents 12 19 mg Nia in may be u ed the apeutically as a v sodilating agent for head a h myalgias ne rological disord s and edema of the labyrinth (100 mg o m re daily in divid d dos) Niacinamide does not pos ess this va odilating effect

P llagr (Code No 010 7623)

The et ological f tors of defi ie cy are imilar to those of thiamine def ci y Nia in def i ncy is the principal but n t the only dietary d fect in pellagra

A Mild or Ea ly Manif st tions Multipl vague complaints and dden d ough ned skin Redn ss and hypertrophy f the papillae of the t ngue

B S vere o L t Manifest t ns Ma ked r ughening of kin when xpos d to light and f ctuo diar h a abdominal di t nt on c l t r d tongue with atrophy of p pills st m titis de p ession louding of mentality rigidity and peculiar s cking es ti n

C Tr tme t

1 Sp ifi m asures

a N otinamid U S P B P (niacinamide) 50 500 mg I M I V or orally daily until ymptoms subside Ni tini A id U S P B P (ia in) is le s often us d be se of its v odilating ff t d sage is similar

b Suppl m ntary vitamins Give th r peuti dos s f thia min riboflavin and pyr doxine

c Dried Yeast T blet U S P 30 Gm t i d

2 General m asur

a Well balanc d (2500 4500 C l rie) high p t in di t

b Symptom ti and ppo tiv m asu es s indi t d Dementia m y r quir constant s pervis n

VITAMIN C (Ascorbic Acid)

Vitamin C i on r ed with fo m tion and mainte ance f inter ellular suppo ting tructures (dentine cartilag collagen bo mat ix) It bio h mi al a tion i n t known Diet ry o rce *in l d itru fruit tomato s p p ika bell peppe* *U I afy* gr en g tabl Asco bic acid o t t f foods is m rkedly d cr s d by ooking mincing ai co ta t alkali and cont ct with opp tensils Di ta y allowance fo dults a e 70 75 mg daily du ing p egnancy and l ct tion 100 150 mg As orbic c d has also be us d in th tr atme t of ertain po n in do e of 0 5 Gm or

must always be supplied in the pres ice of adequate (dietary or parenteral) sou c s of all of the other members of the B complex Water soluble vitamins should be administered in di ided doses throughout the day to prevent exces ive loss in the urine

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A Mild or Ea ly Manifestations V gue multiple complaints sug g st neurasthe a and include anorexia formication and m s cle cramp tenderness of alve pa esthesias and hyper activity followed later by hypoactivity of knee and ankle jerks

B Severe or Late Manife t tions (Be beri) Severe anorexi polyneur tis serous effusions sub utaneous edema pa alyses (particul rly in extremities) and cardiac insufficie cy mani fested by tachy rdia dyspnea edema and normal or de reas d cir ulation time elevated venous pressure and non specif c Ecg changes

C Treatme t

1 Thiamine Hydrochlo ide U S P (Aneurine Hydrochlo id B P) 20 50 mg orally I V o I M daily in divided dos s for 2 weeks then 10 mg d ly o ally
2 Dried Y st Tablets U S P (b ewer s yeast) 30 Gm t i d
3 W ll balan ed (2500 4500 Calor s) diet when tolerat d

VITAMIN B_2 (Riboflavin)

Riboflavin serves as oen yme for hydrogen transfe It is present in milk and milk prod ts l afy green vegetables and liver Daily dietary allowan es for adults are 1 4 1 6 mg in pregnancy and la tation 2 2 5 mg

Avit minosi B (Ariboflavinosis) (Code No *010 7622*)

The etiologic l factors of ariboflavin sis are simil r to those of thiamin deficiency but inadeq ate intake of milk is important The manif stations of deficiency usually o r along with thi mine and niacin deficiency but may oc u ea lier

A Mild or Ea ly Manife tations O al pallor superficial fi sur ing at angle of mouth conjunctivitis and photophobia lack of vigor mal ise weakness and weight loss

B Sev r o *Late Ma ifestatio s* Cheilo is (fi suri g at the angles of the mouth) *fissuring of the nares m gent tongue*

Chapter 5

DISEASES OF THE SKIN

GENERAL PRINCIPLES

H sto y nd Phys al Ex min tion

A T k a ca h to y fr m e y pat ent w th a kin d e e
B Do not gl t th r l of o tit tio l factors in p od tion or aggr tion of sk dis a (g inter l d s se n rv us fa tor di t ry aberr t s et)
D E ami e nt re body s fac in good l ght

Planni g the Tr atme t

The e s b w ld r g v iety of d mat log c g nts l g n r l t s b tt to b th roughly f m li with the act o s f a f w d gs and t e tme t meth d th to attempt to use a g eat many

A Cons d r th g ral h racte of the indi idual sk n
1 D y k s s lly requi e l br ating or oftening ag nts
2 M t r ly skins us lly r qu e gr s l s drying gents

B B gin t e tm nt w th m ld impl r m dies l g er l
1 A ut nflam d lesions Sooth ng o i ritating g nt
Chr th k d l si ns Stim l ti g or k atolytic ge ts

C Apply small p l mina y mo nt of m di ame t t si gle small ea to t t fo sk s ns tivity

D D n t h g m d to oft All w agent t m to ct How di o t m dy mm d t ly if ntowa d lo l r t n de l ps

E I st t th p t t refully on how to pply m d am nts

F Whe i d ubt a to p op r m th t f tr tm nt UNDERTREAT th tha e tr t

CORTICOTROPIN (ACTH) AND THE CORTISONES

I t of th t r t n or f lmi a t d m to o t t pi (ACTH) r th rt on s m y e t d amat c o e e a l f i g eff t tably ang on u ot c d ma t p d m t t xf l at v de m t t s p mph gu l p s e yth mato s d d m tomy s t Th ff t of h t du t aft th ag t h b w thd w R l ps ar n t u comm d ing and after t atm t Mai t e th r py m y s pp e c nt ol ce ta n of th d rm t es b t s ld m It is mpo tant to de sta d th physiolog and pha m c l g ff t of these dru h optimum b n f t f om th py (ee p g 383)

Top al s of som f th ti one v ry _ tu t t d m titi and em (

more Proof of its value is lacking It i used in dosag s p to 200 mg daily orally for heal ng wour ds o ulcers o dur g r co ery from protra ted dise s (e g tub r ulos s)

Av taminosis C (Scurvy) (Code No 010 763)

Scurvy is usu lly due to nadequate intake but may oc ur with ncreas d metab l c needs

A Mild o E rly M n festat o s Ed ma and hemorrt age f ging vae porosity of dentin hype keratotic hair foll cl s
B Severe or Late M fest t on Sev muscle ch ng s swell ing f the jo nts ra faction of bon marked bl eding tende cy extravasation of blood nto fa al lay rs anem a l os n ng o loss of teeth nd poo wound h ali g
C Tests for D f en y Capillary res stan i red ced and x ray of long bo es m y show typical hanges Ther is l o a l weri g f se um or white blood cell asco bic acid levels
D Treatm nt
1 D f cy Sod u n As o bate I je t o U S P 0 5 to 1 Gm I V o I M daily n di ded do s a lo g a d fi i ncy la ts A o b Acid U S P B P m y be g n rally i about th sam dosag
2 Inc ased d mand Asco b c Ac d U S P 200 300 mg *per d y o ally*

OTHER VITAMINS

Many othe v tam s hav be ch ra t ri d S m im port nt in human tr ti n d d e m st play kn wn ole Am ng th m t mpo tant w th all ged clini l fuln ss

Py d n Hyd ochlo de May be impo ta t tr n am t n d d ca boxyl t n of p ot i ( ) May liev e o s symptoms d w k e n p ll grins wh m n fa l and may el ev th glos ti and he lo s n d d by iboflavin Its rol (f any) in hum th scl ro s is e t n D age 10 50 mg I V or I M d ly w th oth r facto s of the B compl

Ch l e Found in ph spholip ds and methyl do or a l potropi sub tance and a growth f tor It found in large quantiti s n yeast It has been sed to treat f tty i a ges in the l ve p re chyma in h om liv r disease

Fol Acid *(Pteroylglut mic A id L c e fa tor) Seems to be* essential for the met bol sm of c ll nu lea mat rials Effe tive in certa n ma rocytic anem a (see p 222)

V tami B_t (L l ct s Do n f tor) A pho phorus and ob it ontaini g material is lated f om pu f d l er xtr t probably th ffe t e pr n ipl la k ng in p rn i anem (see p 222)

Vit m P (Rut n H p rd din M thyl Ch l one) Th se lat d sub tances m y r d e apillary f g lity and n y also red c th *th eshold of* respon e of th pre p llary phin t r to pi ph ine Th ir ole in human disease i qu stl nable Do ge Hesp ridin methyl chalco e 0 5 1 Gm d ily orally R tin 20 40 mg t i d q i d orally

Inos t l H s been h wn to be a lipotropic subst n unde r tain very spec al o diti ns in some spe f animal It role in human nutrition and t *use* in li er dis ase a tl ely uncle r

Mis ellaneous The r les of p ntoth *i acid ed yll acid pa* aminoben o c a ia and b ti in h mans are u determi ed

di der d ct th r py a cordingly

3 E t l irr tant (g rough cloth g oc pat nal t tants) hould b a id d

4 Bathing p ctice Soap hould be a oided in indi iduals w th dry or ir t ted skin St ch b th may be u ed (s e previous pag)

5 Na ls h uld b k pt t imm d and cl an d

6 A o d s tching, if possibl beca s f vic ou cycl wh ch an b e t blished

7 Unn ess y med cat on hould be stopp d since med cat n its lf an oft n p du e p itu

8 Ant pru tic d g Th Ioll wing ag nts m y be of ben f t

Cal m Gl c nat Injecti U S P 10 I V lowly on daily o every other day p

b Antih tamin drug m y be tried in rt in cas s f p rit s of all g c or und te mined tiology Fo a list of mmonly u d antihist mini prepar t on s p ge 45

Epin ph n Inject n U S P 0 25 1 0 c (4 16 min) of 1 1 000 solut n every 4 hou s m y b f val e in a ut cas s s p t d of b ing due t all gy (rt a)

d Ph n b b t l U S P 0 015 0 03 Gm (1/4 1/2 g) b i d o q d m y pro d u f l ed tion n ag t ted r emot o ally dist ted p ti t R m mb th t b b t r t th m l may prod e d matt (ely) A t hem ther py Som d m tologi ts dvis the in jection of 10 c of the p t nt s whole venou blood i to th h p mus l y 48 hou s for 3 nj tio

f C t ot op Inje t on U S P S pag 424

DERMATITIS VENENATA (Contact Dermatitis)
(code No 110 3001)
(Dermatitis Venenata Due to Plant Irritants code No 110 378)

An cut o h d mat tis whi h r ults f om dire t on t t f ch mi l o othe r tants with the skin Les on mo t oft n on e posed p rts and m y b asymm t ical (f d to int n l gents) Lesion aggr vat d by xposur to th irri tant and th sho ld b avoided Pat h t ts m y b of value in d gn s co ob ation of lini al impre ons

Diagn s

Su v y th p t t s vi nm nt and study h tot l ctivities t d termin irr tant

A S ch f a hist y of r ent exp r t new hemical d ugs soap osmet r oth ont t i itants The l ca ti of th l si m y be f value in id ntifying th i tant e g lp (rin e o h mpoo) f (so ps h ving m t i l o m ti) eck (jew lry clothing) trunk (cl thing) uppe xt miti (ps o m ti plant toxin indust al h m al) and low extremit (tocking shoes hoe dyes)

COMMON DISORDERS OF THE SKIN

PRURITUS (Itching) (code No 143)

Tre tment

A Spe fic M asu s *Remember that localized (as well as generalized) pruritus may result from systeml causes*
R move or treat spe ifi causes whenev r possible
1 Skin inf stations (e g scabies pinworms ped culosis)
2 Skin infections (e g fungal and bacter l infections)
3 Skin inflammations (non infectious) (e g liche planus e zem urticaria)
4 Altered sweat se ret on (e g hyperh drosis anhidrosis)
5 All g c reactions (e g food drug lothing serum etc)
6 Sen le d rmatosis (e g senile skin atrophy)
7 Metabolic disease (e g d abetes hyperthyroidism go t)
8 Uremia
9 Jaundi
10 Opiate intoxication (e g morphinism)
11 Blood and neoplastic dis as s (e g l ukemia lymphom)
12 P ychogenic factors (e g anxiety stat s)

B Local Me su s
1 Shak lotion emuls ons and ointments incorporating the volat le analg sics and antipru itics li ted in tables o p ges 100 and 107 m y be of value in l ev ng itchi g
2 Relieve e cessive d yn ss or moi tne s of skin
a If skin is too d y soften ng agents may affo d relief e g ose water ointment (℞ 31 page 103) An e c l lent p inciple for dry skin is to wet it s in a bath (to hyd ate the ke tin) th n apply pet latum to the wet skin to trap the mo st e
b If skin is too moi t drying age ts may aff rd reli f e g wet dr ssing so ks (℞ 1 8 pag 98 99) h ke lot ons (℞ 14 16 pag 100) nd powde (℞ 9 12 p g 99) (e peci lly if pro e s acute)
T b baths Ge e ali ed p ritus may be effectively co troll d by lukewa m baths 15 m nute b i d or t i d After bathi g th e skin should be bl tted n t rubbed
(1) Star h and sod b th l 3 cups tar h and l up a di um bi arbonate d s l d thoroughly in t bful (50 gal lons) of l kewa m wat r (Soda may be omitt d)
(2) Tar baths Di olv 50 100 Coal Ta Sol tion U S P in one tubful (50 gallo s) of w rm wat r (Watch for sen t v ty)
CAUTION Avoid excessive dryi g of skin by over-bathing prolonged bathing periods and exposure to drafts after bathing

C G al M as r
1 D t
a Food should be simple Avoid rich and spicy foods
b Test diets or elimin tion di ts sho ld be used in cas s of suspect d food allergies (see p g 56)
2 P y hotherapy If pru itus is prim ily a ma fe tation of an anxiety stat obsessio compul ion o p ych tic

ERYTHEMA NODOSUM (Due to Infection code No 114 1x0)

A tender nodular erythematou dermatosis occurring most c mmonly on th ext nsor urfaces of th legs and (less often) for arms It is usually aus d by toxins of infections and occasion lly by drugs The d ease occurs mo t commonly in the spring or fall and us lly runs a cour e of 2 6 we ks or longer

Tr tme t
A G l M su s
1 Eliminat or treat the specific c us
Inf tions Almost all infe t ons (coccal tuberculous my otic or ıral) are cap ble of causing erythem nod s m F r tr tm t se spe if c diseases
b Exogenous toxins e g d ugs or ch mi als
2 R st Hospit lization m y be advis ble
3 Foc l inf tions May be co rected although this does not app ar to influ nc the cours of th diseas
B Lo al Mea r U ually unnecessa y but if l s ons are trouble om or omplicat d tr at acc rding to st ge and type of d rmatit (s e pag s 93 96 97)
C T tr cyclin drug 250 mg q i d for s er l days h ve be n shown to be eful n som ca (emp ic den)
D St r id th apy may be us d if not o tra d ted (tuberculosis m st b rul d out) G v Repo t ry Cort otropin Inj ti U S P 20 40 u t 1 M daily o very th day fo o two weeks or e of the ortiso s (gen lly n larg doses)

ERYTHEMA MULTIFORME
(Infection code No 11x 190) (Poison code No 11x 3x7)

An s t inflamm to y polymorphi kin di ea of multiple o und t min d or gin Th e is oft n a hist ry of drug posure or of e nt o cu ent infection The skin l ions found most f equ ntly n the d sa of th hands and f ms and on the f t n k h ks bu cal mu ou m mb and g nitals The ill s is us lly elf limited alth gh t i f qu tly urr nt

T tm nt
A D finit Me s r
1 Eliminate aus tive f to
Ch onic yst mic inf tions (g tub cul i)
b Foc l inf t on
S siti ıng drug
2 P c llin p r nte 1 150 000 300 000 units I M s sa d to d the xt t and du at n of the illn s wh n s d y fe t n is p ent (CAUTION)
3 O yt t y l hlo tetr ycline 250 mg q i d for 1 day m y be u ful
4 Co t o te o d may be t d as fo ryth ma od um
B G l M u B d t and good n sing ar whe f ver p t
C Lo al M T t tag and typ of d m titu (s e p g 93 96 97) Th f llowing p inc ple should be o d red

B Use protect v isolation in certain selected cases cautious re exposure may help to establish the irritant

C Patch tests may be of value b t false positive and false nega tive rea t ons may occur Dermatitis produced by such te ts *should r semble th clini al dermatitis In the event of a* po t ve rea t on a ontrol test should be done on a normal ind vidual

Treatment

A D f n tive M asure

1 Pre ent re expo ure to irritant
   a Avoid soaps and detergents
   b Cosmet cs Change to so called non all rge ic cos m tics or elim n te cosmetics entirely
   Occupat onal i tants
      (1) P tectiv rubber gloves may be used but are seldom ind t d In such cases an inner cotton glove must b used
      (2) P otective reams (barrier creams) may be tried but are lmo t us les
      (3) Change of oc upati n or duties to those not involving use of rrita t age ts may b necessary
   d Plant rritants (esp cially Rhus species e g poison ivy)
      (1) Dest u t on of pl ts by manual removal o by chemi al means (2 4 D or d chloropheno y ceti cid) n r dw lling and n are *s frequented by peopl*
      (2) Avo dan of Rh s infested ar as
2 Prompt and thorough emoval of irritant by p olonged wash ing or by emoval with s lvent or othe chemical ag nts may b eff ct v if applied ve y shortly afte exposur In the of Rh s toxin thorough washing w th so p a d w ter mu t be d w th n a few minut s if it is to be of any val

B Loc l M su Treat stag and type of d rmatitis (S pag s 93 96 97)

1 A ut w ping d rmat ti
   a Do not s ub l si n with soap and wat
   b *Apply oothing sol tio s (see tabl on pag 98) If e p* t on becom s gene lized use th soothing st rch and b arbonat antip uritic bath m tioned on pag 66 Shak l tio s (℞ 14 16 page 100) may be indicat d instead of wet d es ings o in l ter al between wet dressings e p c lly in inte tr gi ous a or when oo ing is not marked Les on on th extremities part ul ly may be bandag d with wet d essi gs
   Hydroc rt son a d fludr o t p eparat o (35 diff r nt p ep at o s of hyd o t o e o th ma k t) lot o cream o o tm t ppl d p i gly 4 *im* d ily m y be ry h lpf l
   S ba ute d rmatiti (sub di g) Use shake lotio
3 Chronic de matit s (dry nd lich if ed) Tre t with hyd o ph lic gr sy oi tments o cre m Tars r p h p mo t us f l i th s stage of the d rm titis

C G er l Me es Repo itory Co tico ropi I j ctio U S P (rt t op g i) *or on of the cortis m y b tri d* (CAUTION) and rep ated d ily (see p g

2 Cortiso in lotion ream or ointm nt fo m appl d sparingly twi e d ily may be ery h lpful (se page 424)
3 Treat the clinical type and stage of the de mat tis
   a Ac te we ping l sions Us solutions listed n table on p ge 98 as soothi g or ast ing nt soaks baths or wet dressings in th d ytime for 30 minutes t i d or q i d Shake lotions (℞ 14 15 page 100) m y be mploy d at night o when w t dr ssi gs are not de irable Les ons o ext em ties partic larly may b ba daged f r p o t tion at night Powd rs (℞ 9 11 12 pag 99) may be u d in int trigin s ea when oo ing is not m rk d
   b Sub cut or s baiding lesions m y be tre ted with sh ke lot on which may incorporat mild antipru iti or mild stimulating g nts (s e page 107) Shake lotions re usu lly pref rred for wide p ead les on Ointm nts (ee p ge 104) containing mild tar may b u d (s e table on page 106)
   Ch onic dry lich nif d l sions ar best tr ted with ointm ts eams a d p st s (see p ges 102 3) employ ng lub cat g keratolyt antipr ritc a d m ld k ra topi sti ag ts m ti ed the table o pag s 106 7 ind at d The t s a e perhaps the mo t popula th p tic gents in chron c e zema (2 5% o l tar in ointm ts c m and pa tes) Iod chlorhydro yqu n U S P (Vioform®) 3% o Chlo q i Idol N N D (Ste osa ®) o tme t o cr am m y be ed i h y a as o f the a dio yn asy t t r
4 X ay th apy (by spe ial st) may be sed effe ti ely if only t mpo rily n many stages

DERMATITIS MEDICAMENTOSA (Drug Rash)
(code No 110 3)

An ut or hro i inflammatory kin eact on whi h caused by a wid r ty of dr g and which cau s wid variety of skin l ons in su ceptibl ind vid ls The rea ti n m y be imm diat o d l y d (to f w w ks) and may or may n t be a oci t d w th co stit tional d sturban e (f ve h ada he etc) Improvement following withd awal and limination of the sp ct d d ug usually take a few d y b t may t ke lo ger A rule it is not dvisabl to tt mpt di gno tic pro ocation o an e e b t n by re xp sur to th drug Skin t sts are ld m of any value

T tme t
A Sp ific M a u e
   1 Stop all d g if po sible
   2 Ha ten elimi ation f drug by in re s ng fluid intake
   3 Giv sp cifi d to ifying ag nt
      Dim r pr l U S P (BAL®) m y b t i d in s d to h vy m tals (a s nic m r ury gold et) (see p g 536) *Ed thamil C l ium D d um N N D (Ve nat ®)* m y be worth try g f r lead p iso g (s e p g 541)
      b Sod m chl r de 5 10 Gm (75 150 g) d ly o lly may ha t n elum nat n of bromid s and i d de in e d to tho d ug (p ges 538 d 540)

1 Acute lesions Employ simple wet dr ssings and soaks or soothing lotions For tr atm nt of buccal lesions se page 261
2 Subacute lesions Soothing lotions

Prophylaxis

Avoid all unneces ary medi tion in susceptible individ ls i e patients with a pr vious history of erythema multiform

ECZEMA (code No 111 390)(and Eczematoid Dermatitis)

A large group of non specifi acute or chronic superf cial in flammatory skin re ct ons which occur as a sult of exposure to chemical physical or unknown irritants or as a result of allergens Irritants may be exte nal (e g contact dermatitis) or int rnal (e g dermatitis medi am ntosa) There may be a history of allergic tendencies (atopic e zema) and blood eosinophilia may b found The term e matoid d rmatitis is used for ec em like reacti ns of undetermin d origin The l sions f ecz m a e usually pruritic Acute lesi n a e usually eryth m t us v sicular or *exudative Chronic lesions are usually thicke d d squamative or* lich nified

Treatment

A Sp cific Measures

1 Elimination of inciting agents (see above) is in a s nse the only sp cific m asure A ref l hist ry trial and err r elimination and exposure t chn cs may be of v l in in criminating p ific offending ge ts Skin t sts are often valu less Desensitization is of no v l e S n itiviti are usually mult ple
2 Diet Should be ad qu te and well balanced There is no evidence to ggest th t standardized or ro tine dietary re strict ns are f valu sp cially in ad lts T ial di ts or elimination di ts m y be of value in det rmining food aller g s in individ al c se when an urticari l component is present Food diaries m y be kept by patients with chronic e ema to d termin po *sibility of food allergy* R ported ommon food offende s are wh e t milk ggs po k fi h sh llfish tomat s st awberr s and hocolat
3 Psychotherapy An att mpt may be made to det rmine and co re t existing emotion l disturb nces but thi is of no p act cal value
4 R move definite foci of infection but a oid outine poly surgery

B Ge e al Mea e Corti otr pin (ACTH) or the o tison s m y p ovide pe tacular imp ovem nt in se ere o fulmi ant ec ema (s e pag 424)

C Local Treatm nt

1 Avoid all unnecessary local irrit tions to th skin such a m y occur from e ces iv bathing, or as a result of xposur to irritating drugs ch micals gr ases and oaps Soapless deterg nts a e not advisabl Clear up skin infe tions promptly (particularly tho with xud t) by appropriat m asures (s e pages 64 65)

4 Topic 1 ti infecti e drugs [g 1% aqu s n omyc o yt tr cy li e hl tetra y line hloramphe i ol (CAUTION) ythromycin o polymyxin B o tments] ho ld be us d when n e sary (see p ges 84 86 a d 107)

P ophyla

P i t r c i i g s n iti g drug should be w tched e f lly f r th de elopme t of kin actio of all types Th drug sho ld be w thheld u til th tur f the sk re ti n determin d Def t sen it atio m y b o s d ed a absol t contraind t n to f ther d g adm strat o

DERMATITIS ACTINICA (code No 110-451)
(Erythema Solare or Sunburn)

A ac t flamm to y skin e cti n following pos to s la th ultra olet r diatio It m y v ry from s mple erythem to e xf llat on and may be ssoc ted with sy tem ma fes t tio Som i d d ls ab o m lly light s tiv

T tm t

A Symptom ti M Tr t onst t t al ymptoms by pp p at ppo t e m ur Co trol p i bur g f er d g t oi t t l d th symptom s they

B Lo l M Tr t as f ny ut de m tit (ee p g 93) F st co l g d sooth g wet d ssi gs (s pag 98) d foll w with l t o (s pag 100) Gr es m st b a ded b e of th ir o clu i e ffect

C F r polym pho s a d other l ght it ty rupt o s Chlor q Pho ph t U S P 0 25 Gm (3 3/4 g) b i d now appea t be the t e tment of hoic F s v re r l t ant ases Cho o Go adot op N N D 500 it I M daily o Gold Sodium Thio ulphate N F 50 mg (3/4 gr) I V o ce weekly (CAUTION) may be t ed

P ophyl

A I d d l w th v y bl d sit sk sho ld o d st o g d p olo g d pos to the su o ultr l t d t on P l mi a y o d tio g by g ad d p s is d l bl

B P ot ti Ag t Apply to ki b f po u e t d tion

1 P am ob zo Ac d N F 10% t hyd phil ointme t
2 C bolat d (phen liz d) V lin ® s a good s n
3 Menthyl a thra ilat (5%) a d 5% t t ium d o de e m
4 D g lloyl tri leat cr m (N o A fil®)

LICHEN PLANUS (code No 110 865)

A h oni i flammato y ki d s e of kn w s ha ct d by sm ll flat topp d i l p t p p l wh ch a angula in h pe (u lly q d l t l) a d of va y g s s th y commo ly n the fl o u f c of th fo m a d th gh o the l w p t of th b ck and n the g nital Th e m y b as oc t d b l l s s R id l p gme tat n a d t ophy m y oc u but s lly the e a e qu l L h plan m y b im l t d by d g upt on (b sm th q in fe

B G ne l M asures
1 Discontinu all unnecessary medication when feasible for as long a period as possible
2 Treat systemic manifestations as they arise e g anemia, icterus purpur etc
3 Antihistaminics may be of value in reactions of urticarial and angioneurotic character (see page 66)

C Lo l M es Treat the varieties and stages of dermatitis acco ding to th major dermatitis which is simulated
1 Ec m toid (see page 70) 5 Urticarial (see page 78)
2 Acneform (see page 77) 6 Bullous (see page 86)
3 P uritic (see page 68) 7 Lichenoid (see page 73)
4 Pyodermal (see page 84) 8 Exfoliative (see below)

EXFOLIATIVE DERMATITIS (code No 110 966)

A serious cutaneous r actio often d e to sensitization to certain drug (e g a enic and gold) and also commonly caus d by lymphoblastoma It is characterized by itching weepi g ery themato s patches wh ch rapidly coalesce and spread to become general ed Finally a desq amation or exfoliation of large areas of skin occurs There is an associated severe co stit tional r c tio with fev r and other systemic symptoms The disease ru s a course of weeks to mo ths and is attend d with a high mortality rate

T eatment *This is a medical emergency*

A Specific M asu e
1 Stop ll d ug if po sibl
2 Hasten elimin tion of off nding drug by all means e g by in asing fluid int ke
3 D m r pol U S P (BAL®) may less n the se e ity or d at o of r act o d e to arsenic or gold (see p g 536)
4 Co t otropin I je ti U S P 20 40 units I V o I M or Co t o e A tat U S P 50 100 mg I V o o ily d ily if i d at d

B G er l Me s
1 Ho p talize p t nt when pos ible Use talc o b d sheets
2 K p oom t warm c t t tempe at e A oid draft
3 Institute s pport ve m t a sf sions plasm t
4 *Avoid all unnecessary medication*
5 Co t ot opin (ACTH) o o tiso e m y pro id sp ct la improvem nt in e r or f lminant e foliati e derm tit s (page 424)
6 S cond y inf ctions P nicillin o oth r a tibiotic dr gs hould be giv n when th is evidence of bact rial infe ti (see pag s 84 86 for do ag s hed les) Pyode ma is th most sev re mpli ation of exfoliative dermatit s

C L cal Me u
1 Ob rv car ful kin hygie
2 Avoid irr tating l al ppli tions
3 T e t skin as for acute extensi derm titis
   a First Wet dre si gs oothi g baths (se page 66) powders (see p ge 99) and hake lotions (see page 100)
   b Later Soothing oily lotio s (see pag 100) and ointm ts (e pages 102 103)

4 Top c l a t i f ct d ugs [g 1% aqu n myc oxyt t y l e chlo tetracy line hl ramphenicol (CAUTION) ythromy in or polymyx B oi tme t] hould b us d when ce s ry (ee p g 84 86 and 107)

P phyla

P t t rec g s t g d ug hould be w t h d c e f lly f r th d elopme t of skin tio of ll types The dr g sho ld be w thheld until th atu e of the sk rea t n is d termined Defin t ens t atio m y b o s d d an absol t cont aind t to f th r drug dm t atio

DERMATITIS ACTINICA (code No 110-451)
(Erythema Solare or Sunburn)

A ac t inflamm to y kin ctio foll w g po to s lar oth ultraviolet r d atio It m y ary from mple eryth ma to s e xf liat on and m y b soc ted with sy t mi m f s t t o Som ndi d ls a ab o m lly light e s t ve

T tm t

A Symptom ti M ee Tr t onst tut o l symptom by pp p lat ppo t e m r s Co t ol p in bu i g f d ga t o nt t l d th symptom s th y a e

B Lo l M s T t as f r y t d rm titis (ee p ge 93) F st cooli g a d sooth g w t d g (se p g 98) d follow with l t o (s p g 100) G s m t b oid d be e of th ir o l e ff t

C F polym rphou s d oth l ght s ti ty ruptio Chl o qu Pho ph t U S P 0 25 Gm (3 3/4 g) b i d now app t be the t eatme t f hoic Fo s er r lci t ant ases Cho n Go adot op N N D 500 its I M daily o Gold S dium Thio ulphate N F 50 mg (3/4 g) I V o ce weekly (CAUTION) m y be t ed

P ophyl

A I d d l w th e y blond s it v sk sho ld o d tro g d p lo g d exp s to the su or ltravi let d t n P l m ary o d t oning by g d d exp u is ad is ble

B P ot tiv Age t sk bef e p s e to adi t on
1 P am ob oi Acid N F 10% i hydrophili oi tm nt
C b lat d (phe oli ed) Va l e® a g od s en
3 Me thyl th a lat (5%) d 5% tita m diox de c m
4 D g ll yl t i le t e m (N o A f l®)

LICHEN PLANUS (code No 110 965)

A h o nfl mmato y sk d ea of kn wn ha a te d by sm ll flat topp d vi la o p it p p l whi h e angul n h pe (u lly q adr l te l) and of y g s s they c mm ly on the fl urf ces f th f arm a d in thigh o th l w p t of the b k and the g t l Ther m y b so i t d b cal les s R d l p gme t t on and t phy m y b t lly th e a e quela L h pl s may b simul ted by d g pt on (b m th q in

Treatment.

A General Me su es

1 Phenobarbital U S P 15 30 mg (1/4 1/2 g) b i d q i d
2 Psychotherapy Patients are often high str ng or tense and nervous Episodes of dermatit s may follow emotion l crises Measures sho ld be directed at relieving anxiety
3 Chloroqui e Phosphate U S P 0 25 Gm (3 3/4 g) b i d orally for o e month is worthy of trial If chlo oquine is not tolerated hydroxychloroquine sulfate (Plaquenil®) 0 2 Gm (3 gr) b i d orally may be t i d

B Local Measures

1 Use shake lotion cont ining tar (℞ 17 page 100)
2 X ray may be used only in severe c s which hav pro ed refractory to other fo ms of treatment Treatment by x ray *must b reserv d for the speci list*

PSORIASIS (code No 111 961)

An acute or chronic inflammatory skin d sease of g neti ti ology whi h s characterized by m cular and pap lo q amou lesions of varying sizes and configu tion (u ally w th well defined bord rs) The lesi n have dry silv ry scales and bl eding oc rs when these ales are rem d Pru itus i rar except n flexu es or in acute eruptiv s The lesions occur on the ext nsor su faces of th extremities and on the trunk nails and s lp There is sometim s an associ t d dis bling rthriti but n const tutional f ctors Stippling of th na ls may be pathognomonic

Tr tm t

A G er l Me sures.

1 Clim te Warm lim tes se m to xert favor ble ffect
2 Nonsp cific intern l medic t on s of l ttl value w th the ex ption of ar ic which is haz rdo n iew of th r t at re of th les ons d th d l y d effe t of ex ce iv s of a sen (k rato s p th l om)
   a Cyanocobalamin U S P (Vitamin B_{12}) 1000 mcg I M 2 3 t mes a we k is said to be of !
   b A s n c F wle sol ti n (P ta um Arsenite Soluti n N F) h b n e omme ded n dos s of 3 15 d ops tw ce da ly in p t ents w th suba ut or hro i lesio s Dos g dur t on f adm ni tr t on indication nd eve ad bility of th dr g are o t ov sial It may b g ve n rep ated co r s f i d t d b t ea h o s hould t be ont d l ge tha 2 3 mo th (see page 239)
3 Psychoth rapy Re su ance *is imp rtant since thes* p tie ts are apt to b di cou ged d e to chronicity of the dise se An att mpt sho ld be made t r li ve ex ting an iet es

B Lo al M as re

1 *Acute psori s (Avo d i rit ting or stim l t g drugs)*
   a Begin with a shake lotion (℞ 14 15 pag 100) or bl d *intm nts (ee page 102)* containi g 5% dete g nt sol t on of coal tar
   b As les ons be ome l ss a ut mil

ke at pla t c ag nt (s p g 106) to lotions (see pag 100) and hyd oph l ointm ts (ee page 103) W tch p t t ar f lly

2 S ba te p o ias
   a G ve wa m baths da ly sc bb ng the ski lesions tho ghly with b ush o p a d wat r
   b Apply crea g o centratio s of k r topl tic or st mu lating gents (e p ges 106 a d 107) i o po at d in l tio s (ee page 100) a d hyd phili ointme ts (ee page 103)
   Sol r o ultr iolet i r d ations m y be ppl d in g d ally in si g dos

3 Chro psorias s
   Amm iated Mer u y O ntment U S P (5%) l cally b i d
   b A th al N F 1/4% ointment lo ally o c a day (d y)
   c Comb d ult avi let i r d at on d t r g men (m d fied f m G kerm) (Daily n ed d) Smear 2 5% l ta ointm t (s p g 71) th kly on ki d l e f 12 24 h u s Wip off o tm nt with miner l il l av g l ght t l Foll w with da ly gr d d s b ryth m do es f ltr let i ght as t l ted

PITYRIASIS ROSEA (code No 111 962)

A c mmon mild ac t inflammato y skin d s ase of unkn wn ti l gy wh h is h a te i ed by p p lo quamo erupt n on the trunk ms d th ghs and whi h o curs m r f equ ntly in th p ing and f ll The pap le are pink and oval w th sc ling bo d and p l e te th y a e typically a ang d w th th i lo g al g th le v g lines f the ki A ingl h rald p t h m y p ec d multipl l ion by a pe i d of sev l d y The l sion may or m y not be p urit The d seas usually l ts 6 we k w th without tr tm t

T atm t
A G l M u None
B Loc l M

1 Acute it t d le i s a uncommon If p es nt tre t a f r a te derm tit with wet d essi gs (ee p ges 98 and 99) o w th h k l tion (℞ 14 17 pag 100 101)
2 C al Tar Sol t on U S P 5% n st ch lot b i d
3 Ultr olet light is h lpf l
4 Pru it s S lo l ntip iti meas r on pag 66

SEBORRHEIC DERMATITIS (code No 111 190)

An a ut ch o ic p pul q mo d m titus ften as oci t d w th c siv o lin of th kin and co ing in th so c ll d b o a as f the b dy (alp midporti of f st nal gion and int rs p l region) Th le io ppe (1) a y il w sh gr sy les o (2) an ut or h o i c m tous d rmatitis in e s of seba ou gland c c t ti and in intert iginou r a e tly a p ur ti

Treatment

A. General Measures

1. Diet. Well balanced adequate diet avoiding excess swe ts spices hot drinks and alcoholic beverages
2. Regular working hours recreation and sleep
3. Simple cleanliness
4. Remove aggravating systemi factors (infect ons overwork emotional stress constipation and dietary abnormalities)

B. Lo al Measures. Treat type and stage of dermatitis

1. Acute subacute or chronic eczematous lesions Treat generally as for dermatitis or eczema (see page 0)
2. Seborrhea of scalp
   a. Selsun® suspension (selenium sulfide) follow ng weekly shampoo Fostex® cream (containing soapless cleansers wetting agents hexachlorophene s lfur and salicylic acid) may be used as a weekly shampoo for oily seborrh a
   b. Sebizon® lotion (sod um sulfacetamide) once daily
   c. Mild oal tar scalp lotion (℞ 21 page 101) may be used
3. Seborrhea of non hairy areas M ld stimulating lotions (℞ 17 page 100 or 20 page 101) may be used Ointment (℞ 36 page 104) o 3 5% sulfur in hydrophilic ointment (see page 103) may be used (The addition of 1% salicyli acid aids in removing sca es)
4. Seborrhea of intertriginous areas Avoid greasy ointments Astring nt wet dress ngs (℞ 1 6 page 99) follow d by 5% ammon ated mercury in hydroph l c oi tment (se page 103) may be used

EXTERNAL OTITIS (code No x75 100)

This may be considered a v iant of seborrhei dermatitis and at times may b come an inf ctious eczematoid d rm titis An interference with ceruminous s cretion le ds to inflamm tion of th anal wall and predisposition to secondary bacterial nfe t on usually with Pseudomon s aer ginosa (B cil us pyocyane s) Fungi are rar y if ever causative

Treatm nt

A. G n ral M as r s

1. Penicillin 300 000 units once or twi e daily I M for acc m panying fever a d erysipelatou cha ges (CAUTION)
2. Ph nobarbital U S P 15 30 mg (1/4 1/2 g) b i d q i d

B. Loc l M a r

1. A ute lesions C ol wet dressings
2. To r mo e cellular d br s if pres nt Glyc erin f hydrog n per xide w th carbamid as ar drops b i d
3. Iod chlorhydroxyqu n U S P (Vioform®) 3% cream b d
4. Hydrocortisone Ac tate Ointment U S P 1 2% locally
5. X ray therapy in r fractory cases (must be given only by a trained spe alist)
6. Polymyxin B-bac tracin ointment (Po ysp rin®) oxytetra cycline chlortetracycl n neomycin or erythromycin ointments (see page 514)
7. Cor isporin® otic suspens on (hydrocortisone neomycin polymyxin B) may b b neficial when res fail

ACNE VULGARIS (code No 151 7x0)

A mmo infl mmato y kin d se of gen tl origin p o voked by androg s in the mal and p ogest e in the f mal It ally f und in dol nts w th pl morphic l sion (pu tul bla khe ds whiteh ds nla g d pores ysts and sc ring) l c l d typ lly on the fa n k che t bs k and hould

T eatm t

A G l Meas El minat all unn s ry m dicat n pec ally bromid or odides

1 D et Sh uld b deq t and w ll balan ed Avo d exc s of bohyd tes hocol te nut fatty o f d food al coh l bev r ges and sp y food
2 A id o p t on l expos e to min ral oils and g ses
3 E t gen m y b tr d in w m n Th y ho ld b topp d for o w k (pr m st ually) ch month
   Diethyl tilb trol U S P enter coat d tabl t 0 5 to 1 0 mg (1/120 1/60 g) da ly by m th
   b Est g ic S bsta es C j g t d N N D (P m ®) 1 2 mg (1/50 g) d ly o
   Pip Est e S lf t N N D (S lest ex®) 1 5 mg (1/40 g) d ly
   d Eth nyl Estr d ol U S P 0 01 0 05 mg /c in 70% ethyl al h l r bbed nto sk b d m y b h lpf l
4 W t m bl Vitam n A U S P 100 000 t ally ea h d y for 3 months m y b tr d b t has l mit d valu
5 C r t y t m c d g me t l d g tion nst p tio m l trit f ti a m d em t l d turb c s
6 V Aut ge o a d sto k v i es d ther f reign p ot n t g s h e b en mploy d w th qui o l r lt
7 T t cycl e U S P 250 mg d ly e y th day fo w ks o mo ths v y helpf l f ome e f a e

B L l M es

1 Local lean ing of sk n and calp
   a O d y so p f leans g
   b A id g easy l a g r ms d oth r m ti s
   c Shampoo alp l 2 t me w k (℞ 48 p g 105)
2 E tr tio and d in ge f lo al les o s in s l t d ca s
   a Ext ct bl ckhe d w th om do xtr t r afte oft ning f e w th h t w ter compr s fo 1/2 1 ho r
   b In and d in fl ctuant y tic lesi ns w th small sh rp lp l H t mp s 1/2 hou t i d f vor d in g
3 K t pl st d k t lytic ag nt
   a Hot wat o b ric a id c mp s s (not teaming) m y b us d to p od hype mi and desq am t on of l i n
   b K ratolyt lot ons A ne l tion (s lf r lotio) (℞ 19 p g 101) o ulf inol l t on (℞ 20 p g 101) may b tr d th y a appl d loc lly to the kin t bed time a d wa h d off i th m ni g
   c Kerat lyt intm t and p t B gin w th w k p epa t ons and bu ld up as t lerated Apply t b dtim and

remove in the morning

(1) Sulfur 2 10% in hydrophilic ointment (see page 103)

(2) Sulfur and kaolin paste (℞ 39 page 104)

(3) Quinolor® ointm nt or Vioform® intm nt (see p g 107)

4 Irradiation

a Simple xposure to sunlight in graded doses is oft n beneficial

b Ultraviolet ray May be used as an adjunct to other t e t ment or to r move scars Use sub rythem doses in graded intervals up to point of mild eryth ma and scaling

c X rays Thi very effective te hnic should in ge r l, be res rved for only the more severe cases and nly aft r other more conservative measures fail X ay therapy must be reserved for th specialist

URTICARIA (Hives) (code No 11x 390) and ANGIONEUROTIC EDEMA (Giant Hives) (code No 11x 580)

An acute or chronic inflammatory skin r action of allerg c ri gin manifested by multiple m rkedly pruritic whe l eactions of varying s zes w th no characteristi kin di t b tion and at times involving the mucous membran s Acut attacks are u ally s lf limited from a few minutes to a few we ks but have a t nden y t recur In extr me cases a laryngeal ed ma m y cau e a respira tory obstruction and d ath Skin infe tation conta t dermat t s toxic erythemas etc may be other auses of urtic ial re ct ns

Tre tm t

A Gen al Me u s

1 Purg t on In tial purgat on to r mo possibl tigenic mater l has b en recommend d in cute as s Ca t O l U S P *15 30 c (1/2 1 oz) m y b* g ven Sto l m y b exam ned f r p rasit s

2 Di t D r g the cut phase the d et sho ld be s mple d fre of su h c mmon off de s as wh t milk eggs pork fish shellf sh tomatoe st awbe e a d chocol te Past hist y food di ries *trial d ts a d liminatio d ts* m y be h lpf l in det rmini g ffe d g f od The pat t sh ld t mai o a r tri t d d t u l ss t ca be d mo str ted that known food off d rs e st

3 Avoid u c s y m di atio Su pect ll d g (even ep ephri ephed n tih st mini s t cotr p et)

4 D ug

a Antihi t minic drugs often g ve prompt and sust ined symptomatic r lief If pen cillin whi h is being g v n a a life s ving me u produ s an urti ar l p n t is som times po ble to ntin th d g by simul tane u dmini tr t on of an antihi tamin c drug This mu t only b d e w th great c Ex mples of ommon ly u d antih st min c drugs a giv n on pag 45

b *Epin ph n Inj ction* U S P 0 3 1 0 (5 15 ♏) of 1 1 000 sol tio b ut f te l o s wh n

(1) L ryngeal edema s p ct d o prese t

( )U t c ia i int se
(3) A tih atam i drugs ha e fail d to g ve el f
c Ephedrine S lfate U S P 25 mg (3/8 gr) or lly q i d
d Ephedr e edati e m t r fo th py o pr phylax (o e cap ul q i d)
(1) Ephed ine Sulfate U S P 25 mg (3/8 gr) and P ntob rbit l Sod m U S P 25 mg (3/8 g)
( ) Eph drme S lfat U S P 25 mg (3/8 gr) and Phe barbital U S P 15 mg (1/4 gr)

5 Co tic tropin (ACTH) or the co tiso es m y p ovide spec t l r improvem nt se re o f lmina t angion rot c edem (se page 423) These drugs should be ed only if it is appar t th t th pat t will n t respo d to mo e con s at ve m s s

6 Misc ll eo s meas r e ha b n r omme d d for th hro fo m of the d sea e b t their valu is qu tio ed
a Dil t d Hyd ochlo Ac d N F 15 20 d ps t i d a and d ing m ls Br sh t eth aft r me ls with od m b arbo ate
b C lci m Gluconate U S P 1 Gm (15 gr) t i d orally p c Oth cal ium alts may also b us d

B Lo al Meas e Antipr it s a freq ently of b n fit
1 Soothing tip ur t c b ths (ee p g 66)
2 Soothi g a tip itic lotio (see page 100)

Prophyl is

A Elim t d vo d e po u to ca t ve f cto
1 Se t g d g Almo t all d g are apabl of produc i g an ti ial r a t o Op t b rbitur tes s li yl t s p i ill sulfo m des bromid od d a ti hi tam c co ticot opin (ACTH) t
2 Se s t zing food A y food may pr duce a urt ca ial e po se s ceptibl i div d als and should be cons der d in ob cu e a (p ti l rly h c ca es) f u t c
3 Agg a ti g phy i l f to g c s heat nd old kin and muco s memb i r t ts
4 Agg avating systemi f cto s g chroni infections fo i of i f ct ons p iti i f st tio a d blood dy r as

B R li f f P ychi D t rb e I usc pt ble dividual mot o al t e a d t may pr p tat th l ions

INTERTRIGO (code No 111 437)

E ythem d e to ch fi g of th skin

Tr tme t

T e t s tin a cruris (ee p ge 89) but do ot e f g id l ge t

MILIARIA (Heat Rash) (code No 153-445)

An acute dermatitis characterized by small erythematous burning and often pruritic papules vesicles and pustules which occur most commonly on the upper extremities trunk and intertriginous areas it is ca sed by exposure to a hot mo st environm nt

Treatment

A Ge eral M asures
1 Provide optimal working conditions wh n possible i e controlled temperature v ntilation and humidity
2 Avoid overbathing and u e of strong irrit ting soaps

B Local Mea ures
1 Antipruritic cooling lotion apply b i d to q i d

℞ Menthol	1 0	gr xv
Phenol	2 0	ss
Glycerin	15 0	3 v
Al ohol 35% q s ad	240 0	3viii

2 Drying shake lotion (℞ 14 with 1% phenol or ℞ 15 page 100)
3 S lfur resorcinol lotion (for seb rrhe skin) (℞ 20 p ge 101)
4 Antipruriti powders or other du t ng powders (s e p ge 99)
5 Treat secondary infection (pyod rma sup rf ial) with potassium permanganate soaks compres s or b ths (ee page 98) Ammoniat d mercu y 2 5% in a hydroph lic ointment (ee p g 103) may be empl y d d t geo sly
6 T nnic Acid N F 10% in 70% lc hol loc lly b i d

Prophylaxi

A T ugh o ta kin G ded expo (cr sed da ly) t n l ght or ultraviol t l ght may b ef t ind vid al wh w ll l te be ubj ted to hot moi t atmosphere
B A oid e posu to ad r atmo ph ic o d t s f xt mely u c ptibl ind dual

ANO GENITAL PRURITUS
(Ani code No 143 573) (Vulvae code No 771 570)

Di gn si

A Con de th r le f syst m c ses of pruritus anx ty st t s d ab te t ichomonas infe ti n and nte tin l pa a t s
B Rul out all obvi lo al p th log al condit o s f the anu and r ct m bowel ir egul it es o lo al tan us di a s

Tr atme t (S e also Pru it s pag 66)

A G n ral M s
1 Di t Avoid hot sp cy fo ds (e g hot pepp rs r h l) and drugs wh ch an irrit t th anal mucosa
2 Tr at c tip ti n f pre ent (s e p g 254)
3 P ovide n cessary p o tol gi tr atment as ndic t d
4 Inst u t the p t ent to use v ry oft or m ist n d tis u or cloth after a bow l moveme t and t cl an th oughly Women ho ld apply ame pr c ut on aft u in tion
5 I st u t the p ti nt reg rding h rmful and p u itus ind ing effe t of s ratching

B Lo l M u es

1 Phenol ted Cal mi e Lot on U S P ppl d locally
2 S t b ths b i d if the a a is a ut ly i flam d d oo i g us g S lv N t at U S P 1 10 000 1 200 (0 01 0 5%) Pot ium P manga ate U S P 1 10 000 (0 01%) o Al m n m Sub cetate Sol t n U S P 1 0 (5%)
3 U der l th g h ld b cha g d da ly
4 C t ol x ss p rsp r t n by u e of d ying p wd s such as talc (s page 99)
5 Pai t f ssu d or ul t d as w th S lv N t ate U S P 5 10%
6 *Hydroco t one A et te Oi tm nt U S P 1 2 1/2% locally* b d
7 X r y ther py may b us d if oth m ures f il This sh uld b rese ed f r the sp ial t

P ophylaxis

A T e t all p ssibl yst mic or local use
B Instru t th p tie t in prop ano gen t l hyg ne

CALLOSITIES (code No 112-430) and CORNS (of feet or toes code No 148-433)

Tr tm t

A *Cor t m ch nic l b m iici g whi h us frict and e* ult in th ho y ov growths
1 Sho s mu t b prop ly f tted
2 *O thop dic d f miti must be tr ted and co rect d*

B R mov C ll it By
1 P ing of ll aft warm w te k
2 Ke t lysi by us of h m l ag nts
a ℞ S licyl c a id 4 0 3
A ton 4 0 3
Collod on q s ad 15 0 3
S g Apply l lly to allu v ry night and o e w th a t ip of adh si R mo adh siv in th m ing Re pe t unt l corn or llu i moved
b Comm cial sali yli acid c n pl st may b u d
3 A metat r l le ther bar 1/2 i h w d and 1/4 in h high may b pl ed on th out ide of th hoe j t b hind the w ight b aring u f e of th sol

DRY SKIN (Congenital Senile or Environmental)

Tr atment.

A G l I str ti to P tie t
1 Avo d ex ess ve b thing and u no oap Avoid undu d y ing i r tating o k t lytic med ament avoid old o d y e vironm nt
2 Apply mpl g s l b lly to the kin whil it i wet co on t butt eg t bl cooki g fats Hyd ou Wool Fat U S P (la h) L qu d P t olatum U S P (mi al o l) P trol t m U S P or impl oi tm ts (p g 102 103)

3 Soapless detergents may be used when bathing but they may do more harm than good

B General M su es

1 Treat complic ting dermatoses (e g scalp eczema and pyoderma) by appropriate measures (see pages 71 and 84)

2 Vitamin A in high doses (50 000 100 000 units daily) has been recommend d but results are q estionable

HERPES SIMPLEX (Cold or Fever Sore) (code No 13 166)

An acute viral infection appar ntly precipitat d by various causes such as fever infection allergy ultraviolet radiation and psychic t auma The small grouped vesicles can occur anywher but are most frequent on the skin and mucous membranes of the face nose mouth throat and genit lia Regional lymph nod s may be involved Attacks are usually self limited but are often *recurrent*

Tre tment

For persiste t o ve e r current herpes

A G neral T eatment

1 Eliminate p ip t ting agents when possibl

2 Routine smallpox va cination t we kly intervals for 6 8 *weeks Eq vocal results*

B Local Meas res

1 *Dust vesicl s tw ce daily with b sm th formic od de (BFI)* powd r or us

Shake lotions (℞ 14 15 p g 100)

b Camphor Spi t N F

c Be oin Tincture U S P (℞ 47 page 105)

2 One of the co tisones in oi tment form 1 2½% lo ally q i d may be of value The m st not be us d fo dendriti keratit s

3 Chlortetr cycline U S P (Au omycin®) 0 5% locally a *eye drops may be of* value in pat ents with dendritic keratitis

4 If th e is associated cellulitis and lymphaden tis apply cool compr s s

5 Treat stomatitis as outli ed on p ge 261

6 Use x ray ther py in selected ases This r qui es admin istr tion by xp rt person el

HERPES ZOSTER (Shingles) (code No 13 167)

An ac te vesic lar d rmatitis of viral o igin whi h has a charact ristic d stribut on rresponding to involv d periphe al sory nerves and is associ ted with v rious local n ve symptoms (neuralgia pruritus b rning *and a tonomic se sory o motor* disturban es) The inter ost l ner e th ensory v of the extremities and the ophth lmic nerves e mo t commonly (indi vidually and unilaterally) involved but th ption m y b g al ized (*resembling* chicke po) The condit on is s ally self limited and nonrecurrent although at *times a persi t t n u lgia may*

ema n The d ea m y b prec p t t d by r m y b e a m nifes t t on of ch f tions local trauma heavy met l poiso ing o lymphobl tom s

T e tm t

A G n l Me s

1 S dat B bit rate or b omides may help cont ol t ion d ervous e s soci ted w th n r ig
2 A alg ic A etyls licylic A d U S P (a pir) 0 65 Gm (10 gr) or asp in mp und w th or witho t Cod ine Ph sph te U S P *30 mg (1/2 gr) us lly o t ol pain*
3 A t hemoth rapy 10 c of th pat e t s v ous blood is ject d i t agl te lly ev y other day fo 3 i je t ons
4 Ophthalm logi al on ltation sho ld b cons de d f su p ao bital i vol eme t to a oid s r o o uls compli atio

B Loc l M s s

1 W t d ss g m y b ec sa y fo a ut and ext siv *i fl mmatory l s s (ee p ge 98 99)*
2 Cal min lot or th sh ke lotions (se pag 100) a often f al e Apply lot n lib rally a d cover with a pro te t laye of c tto b tti g *Avoid grea es*
3 X ray th apy g v n by xp rt m y b h lpful
4 Repo it ry Co t cot pin l je tio U S P (co ticotropin g l) 40 80 u t I M daily fo 3 d ys m y l v the p in

LUPUS ERYTHEMATOSUS (cod No 110 1 9)

D g

A a t r h onic d m t t of kn w o ig n m n f st d by two m n clini l typ s

A Di o d Typ *M ld l cal h o pt o o s d h k (b ti fly p tter)* with o o st t t al sympt ms
B Dis mi ted Typ A se ous sy tem dis a which o rs t a d h on f m w th w tho t d s o d ski je ns a d as oc ated w th f ver we k a mi and v den of diff s lar l s o s ch s e d carditi th t and phr ti (S p ge 519 for d gn i d t tm nt *f th d em t d type)*

T atm t

A G al M a s

1 P fo m mplet med cal st dy to rule o t yst mic l pu yth m tos s
   a E ami fo ch on infect n
   b *Det min* d e l and jo t tat
2 P vid p te ti n f om s l ght and all othe pow ful di t n *Do n t use any f rm f radi tion therapy*
3 M i t i opt mal g al health by w ll balanc d d i w th pplem t y t mi d ron a di t d l ur d q t t d pr cr b b d st wh th pat t i f b il
4 No spe (th py *for discoid type only*
   Qu l Hyd o hlo d U S P (Atab in ®) 0 3 Gm (5 gr) ally d ily f 2 w ks th 0 1 Gm (1 1/2 g) d ily f 3 mo th o m
   b Chl oq Pho ph t U S P 0 5 Gm *(7 1/2 gr)* d ily

for 1 week then 0 25 Gm ($3^{3}/4$ gr) daily watch for signs of toxicity with both of these drugs

c Hydroxychloroquine sulfate (Plaquenil®) 0 2 Gm (3 gr) b i d orally may occasionally be effective when quinacrine and chloroquine are not tolerated

B Local Measures. Treat the exist ng stage of dermat tis by appropriate measures (see pages 83 and 96 97)

INFECTIONS OF THE SKIN

ACUTE SUPERFICIAL INFECTIONS

The acute superficial infections include the following

1 Impetigo contagiosa (code No 111 10)
2 Ecthyma (code No 110 105 1)
3 Sycosis barbae (code No 161 105)
4 Acute infectious eczematoid dermatitis (code No 110 1005)
5 Simple superficial pyoderma (code No 1 100 1)
6 Secondary infections of oth r derm tos s

The offending organ sms are usu lly hemolytic Staphylococcus aureus and/or the streptococci

Treatm nt

A *G n r l M asures. Syst mic anti infectiv s may be tried if the* skin infect on is resistant to lo al treatment if it is xt ns e or severe and accompanied by a febril rea t on if t i com plicated or if t nvol s the s all d danger are s (g area of upper lip no e and y s) (Se pages 496 514)

Pe icill n in daily d sages of 300 000 un ts I M (CAUTION) is con nient and effe ti for thi p rpose but may be m dified in d sage Oth r antibiotic drugs m y b substituted as the ndividu l case demands (ee page 514)

B Local M s u e

1 Cl ans area g ntly with mild s lution of soap and water
2 Soaks or compress s to involved area 15 minutes b i d (see pages 98 99)
3 Wh n skin is softened by soaks gently open larger pustul s and trim away n crotic tissu
4 Local anti inf ctive agents ar of prov d valu These may be tri d individually until effective agent s d termined allowing 3 4 days for evaluation They should be applied initi lly at night and protect d by dressings s aks should be appli d during the day Aft r the area has l ar d any of these preparations may b applied 2 4 times da ly
   a Neomycin Sulfat U S P 0 1% in water locally q d
   b Iodochlorhydroxyqu n U S P (Vioform®) 3% lo ally b i d n cream or ointment form
   c Oth r antibi tics alone or in c mbin ti n as ointments locally b i d to q i d Th s include oxyt tra y lin chlort tracyclin and polymyxin B i combination with bacitrac n or oxytetracycline neomycin hloramphen ol and erythromycin (see pag 514)

5 *Lo al age t a e of al e in c ta n c ses but attended by n rea ed risk of en tization r ct ns P icill and sulf thi zole sho ld not b used in ointm nt form*

P ophyl xi

Cor ect pr pitating or agg avating fact rs systemic cau s (g d bet) o loc l caus (g m hanical or hemical skin ir tations d scharges et)

CHRONIC SECONDARY INFECTIONS

Dete min ll possibl fa tors favo ing chroni ity Obt in bacterial cultur s and det rmin o gani m sensitivity to antibioti ag nt when ver pos ibl

T tm t

A Gen l M ur

1 D t Well balanc d and ad qu te in p oteins and v tamins
2 Co id r use of vig rou syst mic anti inf ctiv therapy

B Local M s e

1 Us lo l mea ure as fo ac te s perfici l infection
2 T t underlying d matosis ac ording to tage and type f le io (s pages 93 and 96 97)
3 Consid x ay the py if ll othe m sures ar in ffective This must be es v d fo th specialist

ACUTE and CHRONIC INFECTIONS of SKIN APPENDAGES

Exami e fo loc l and yst mic c s of these infectio particula ly if they be me s ve or hroni Th f llowing di rd s r in l ded

1 Folliculiti pustula (code N 161 yx2)
2 F runculosi (od No 161 100 0)
3 Carbun le (cod No 18 100 3)
4 H dr denitis (code No 152 100)

T atm t

A Gen r l M es Use vigoro s ystemic anti inf tive th r apy if l lo s eve e t ns e mpli at d o located in d g a ea (ab t e k d h d) T t ycline U S P 250 mg by mouth d ily fo s e l w ek o a t iple s lfo amid (T f yl® Tri omb ul®) t blet d ly may b t ed f r h n i f ti n

B Loc l M u s

1 Avoid o man pulation f inflam d a e
2 U moi t o dry he t to help l g le i ns loc liz
3 U e p op r rgical inci i p l tion or d b id m t *after* l sions a e mature

COMPLICATIONS OF SKIN INFECTIONS

If pathogenic bacteria from infections of the skin invade deeper structures one of th following may be produced and other more serious infections may also occur

1. Cellulitis (code No 18 110)
2. Acute lymphang tis (code No 54 100 1)
3. *Acute lymphadenitis (code No 55 100 1)*

Tr atment

A G n ral Measures

1. Bed rest with immobilization of affected extremity or p rt
2. Systemic anti infective agents must be administered in effective doses (see page 514)
3. *Analgesi s* as neces ry for pain (see pag 32)

B Local M asures

1. Immobilization of aff cted part in slightly e evated position
2. Local heat to area using warm moist compress s if abscesses or pustules are present Avoid ma eration of skin (use no occlusive covering)
3. Local anti infective ag nts to open infected areas t night

FUNGAL INFECTIONS OF THE SKIN

GENERAL CONSIDERATIONS

Diagnosis

Usually based on

A Char cteristics and Loca ion of Les ons (See below)

B Laboratory Examination

1. Direct d monstration of fungi in 10% potassium or sodium hydroxide preparations of scrap ngs from suspected l sions
2. Cultures of organisms
3. Skin tests are not reliable except that a negative reaction to Trichophytin ha excl s on value when a d rmatophytid is under consid ration
4. Staining of histologic ect ons w th p riodic ac d Schiff technic

Treatment

A Local Measur s

1. Treat acute ctive fung l infections initially as f acute d rmatitis (see page 83) *It may be neces the dermatitis before instituting fun oation*
2. Most fungicidal agents are stro easy to overtreat AVOID

B Gen ral Measures and Prophylaxi

1. Keep skin dry Moist skin fav
   a C ol climate wher
   ess ve p rspiration
   and activities in
   y after
   d other clothing

e Sandals open toed sho s sh uld be worn as they pe m t adequate drying f f t

f S r tion of skin should be reduced o controll d

(1) Gen r l o sy temic measu s

( )S dativ s te e o pati nts Phenoba bital U S P 15 30 mg (1/4 1/2 gr) t i d to q i d

(b) Anhidr tic drugs (g at opine) a e us ally in f fective

(2) Lo al m s es

( ) T l o other drying powders (s page 99)

(b) D yi g oaks (e pag s 98 99)

g Tough n skin by grad d daily sunbaths r by qu rt lamp tr atm nt

2 Foci of fung l infections hould be e dic t d or ontr ll d

a Tr t n ils umbili us groin webs of to and other ar as wh e fungi r found

b Group o c mmun ty showe s or b thing pl c s unles st ictly sup vis d hould be avoided

TINEA CAPITIS (Ringworm of Scalp) (code No 162 211)

This o t gious s metim ep d mi cond tion oc ur almo t e clusiv ly in hildr n It is ve y p rsist nt but le s sponta o sly t p b rty The l si ns a e riginally red and s ling and e ult in i ula s e s of alope i Fl or sc n u de th Wood light is char ter tic in Mi ospo o infect on (90% of cases in some area) Th re is oft a histo y of ontact w th inf ted in divid als h useh ld pets

T tm t

A G l M u s No

B L al Sp c f M s It m y qui e 2 month o mo e to cu e th d s s Th h m n type i mor difficult t c than the animal type (dogs and ts)

1 S alp cl an ing and p p ation (N t e s ti l 1)

a Clip h ir losely very 2 weeks and h v p ti nt w r a lean st cking p r k ll c p for protection

b Wa h alp as ne es ary

2 Fungicidal alves Rub the e well into s lp m rning and night afte s alp has b e wa hed

S licylanil d N F 5% i C bow 1500® ointm t (polyethyl gly ols)

b B nzoic id and s licylic cid ointm nt (Whitf ld) *one-half strength* (℞ 34 p ge 104)

Sulfur li yli a id intment (℞ 36 p g 104)

3 Epil tion U W stingh s 250 W tt purple X 1 mp t dem n t t fluo s nt inf t d hai s Remo infe ted hai s daily by tw s by adh siv tape t chni

4 X y m y b u d ffectively and may work wh h mi al and m hanical m s e fail X r y th py mu t b giv n by trained p onn l only Do not r epilat with x r ys

Pr phylaxi

A Ind id l

1 Exchang of h dgear m t be a oid d

2 Infected individuals or household pets must be vigorously treated and re examined for determination of cure
3 Scalp must be washed after barber shop haircuts

B Group
1 Routine school surveys may be advisable
2 Epidemic precautions
a Wood light examina ion of students less than 13 years old
b Isolation of infected individuals in sp cial classrooms
c Careful follow up of infect d individuals and periodic re examination of all children un il all cases are cured
d Education of barbers regarding handling of infected individuals

PITYRIASIS VERSICOLOR OR TINEA VERS COLOR
(code No 11 208)

A mild condition characterized by ta or pink sh ery fine sca ing macules of variable sizes mild y pruritic usually o the upper trunk Healed areas remain dep gment d for a few months Coarse b unt hyphae and large spores in clusters may be demo strated easily in skin scales prepared with 10 15% sod um hydro ide

Treatment
A Ge ral Meas res Encourage no mal skin hygien
B Specifi Measures One of the following may be used
1 Sodium th osulfate 10% aqueous sol tion b i d
2 Mild Whitfield s ointm nt 1/4 1/2 strength (B 34 pag 104) at bedtime

TINEA CORPORIS OR TINEA CIRCINATA
(Body Ringworm) (code No 130 211)

Body ringworm is characterized by single or multiple (relative ly few) scaly papules circul r in shape with clear central areas and with minute vesicles in the actively spreading periphery they are found most c mmonly on the trunk neck and limbs L sions occur occasiona ly as thick pigmented patches Diagnosis should be confirm d by demonstr tion of the fungi

Trea ment
A G neral Meas: es (S e page 86)
B Local M e sures Avoid overtreatment
1 Treat th prop r stage of the dermatosis (see 93 96 97)
2 Fungicidal ag nts
a ℞ Salicylic acid 0 3 gr v
Sulfur ppt 0 9 gr xv
Hydrophilic ointment
q s ad 30 0 ℥i
S g Locally b i d
b Compound Und cylenic Acid Ointment N F may be used in the less chron c and nonthi kened lesions

Prophylaxis
1 See General Measures on page 86
2 Avoid contact with infected household pets
3 Avoid exchange of clothing without adequate laundering

TINEA CRURIS (Inguinal Ringworm or Jock Itch) (code No 146 215)

Erythematou macular lesions with sharp m rgin clea d c nte and tiv sp ading p riph ries in int rtrigino ar as (chafing o fr tion urf ces) such s groin scrotum and axill e Th fungi sh uld b dem nstrated t diff entiate cond tion f om s bo h d rmatitis

T tm t

A Gen l M asu See g e al rules (p ge 86) b t al o
   1 Drying powder (p g 99) should be dust d into involved area 2 3 times a day peci lly wh n per piration is e es iv
   2 B thing Ke p area lean and dry but avoid overb thing
   3 P event intertrigo or hafing by avoiding ov rt eatment thi pr dispos to furth r infe tion and compli t on
   4 Clothing Avoid rough t xtu d clothing

B Local M u s
   1 Tr t p ope st ge of d rmatosi (see page 93) Se ond a ily inf t d or inflamed le ion re best tre ted with patie t in bed applying soothing and drying solution to in vol ed a a U wet omp e s of Potas um Permanga nate U S P 1 10 000 (or 1 20 Alum um Ac t te Sol ti n U S P) o in as of ano gen t l inf tion lo l s aks by tz b ths
   2 F g c dal med am ts
      a Sulf e o c ol l t on b d (℞ 20 p ge 101)
      b W k solutio of iodi e (ot mo e than 1% t ct e) b d
      c Ca bol F ch i Sol tion N F (Cast ll ni paint) 1/3 trength on a day
      d Compou d Und yl A id Oi tm nt N F b i d Sulf r lz yli a d intme t (℞ 36 page 104)

DERMATOPHYTOSIS (Tinea of Palms and Soles) (code No 112 211)

A t em ly c mmon a t o h n d mato is oc ing on th s les palms nd int digital s a it h a st o g t d cy to r cur Acut r dd n d we ping ves ular l sion a s e in th ut st ge (Vesi ular l ions of th f et ar m st commonly due to fungi but on th hands ar mo e ommo ly du to oth r c us s g ontact dermatiti b ct ial inf tions id r action tc) Th ar s aly fis ured and m cer ted le ions in the uba ut tag s and is henif d and rust d l ion in the hroni t g s Diagno is should be onf rm d by demonst ation of fungi

T tm t

A G al M d P ophyla is Se G al M su es (p g 86) but p t p ial mphasis o per onal hyg e
   1 R bbe or wood n s dals hould b u ed i commu ty show and b thing pla e
   2 Open toed hoes and s d ls a e be t f g eral w
   3 1% Sodium Hypochl te Solut on N F foot aks b fo e a d ft bathing in c mm ity how s r of d bat bl lu r l l dryi g betw en toe aft r how

2 Infected individuals or househ ld pets must be vigoro sly treated and re examined for determinat on of cure
3 Scalp must be washed after barber shop haircuts

B Group
1 Routine school surveys may be advis ble
2 Epidemic precautions
a Wood light examination of students l ss than 15 y ars old
b Isolation of infected individuals in special cl ssrooms
c *Careful follow up of infected individu ls and p riod c re examination of all childr n until all cases ar c red*
d Ed ation of barber reg rding handling of infected individ als

PITYRIASIS VERSICOLOR OR TINEA VERSICOLOR
(cod No 112 208)

A mild conditi n characterized by ta or pinkish v ry fine scali g macul s of va i ble si s m ldly prurit u ally o the upper trunk H aled a as rem in dep gm t d for a f w mo ths Co rse blunt hyphae a d large pores n clu t s may b dem n str ted asily in skin s l s prepared with 10 15% od m hydro ide

Tr tment
A C er l M asu es Encourage n rm l skin hygien
B Specifi M asure One of the foll wing may b used
1 S d un thio ulfate 10% aqu s ol tion b i d
2 Mild Wh tf ld s ointm nt 1/4 1/2 st gth (℞ 34 p ge 104) at bedtim

TINEA CORPORIS OR TINEA CIRCINATA
(Body Ringworm) (code No 130 211)

Body ringworm i chara te ed by single or multipl (rel tiv ly few) scaly papule circul in sh pe with clear cent al areas and with minut vesicl s in th actively sp ading periphe y they are found most omm nly on th trunk n k and limbs L si s o u o asion lly as thi k pigmented pat hes Di gnos s sho ld be nfirm d by d m n tr tion of the fungi

Tr atme t
A G n ral M a ure (See pag 86)
B L l Me s s *Avoid overtreatment*
1 Treat the prop r stage of the d rn atosis (see 93 96 97)
2 Fungi dal ag nts
a ℞ S licyl c acid 0 3 g v
Sulfur ppt 0 9 gr xv
Hydrophilic ointm nt
q s ad 30 0 ℥i
Sig L cally b d
b C mpound Und yl nic Acid Ointment N F may b ed in the l s hr nic d nonthi k d le i

Prophyl xis
A S Ge al Measures on p g 86
B Avoid contact w th inf cted hou h ld p ts
C A oid xchang of lothing witho t ad qu te launder

Tr atment

A G l M s r None

B L al M a r s

1 M h cal Sa dpaper o fil daily (down to nail bed if n ess ry) S rg cal avulsio of th n il m y be nece sary

2 F gic d l gents Apply on i fect d n ils

a Iodine T nctu e U S P 0 1 1 0% b i d

b Chrysarobin 4% i hlo form b i d

c Ch y robin U S P 0 1 0 5% in Petrol tum U S P b i d

d Wh tfield s o tme t 1/2 strength b i d (℞ 34 p ge 104) Diamth ole D hydro hl r d N N D (Aste ol®) oi t m t 5% locally b i d

f Ve defam® liquid (odi m prop ionat s d um aprylate prop i acid und ylenl cid s licylic a id copp u decyl nat) applied b i d

3 X y f ctio al dos (gi o ly by t ain d person el) may be of aid in m ld cases and m y requ e m nths for c re Some a thorit feel th t x y ha o plac in the tre tme t of o ychomy is

P phyl

See Gen l Co derat ns p g 86

INFESTATIONS OF THE SKIN

SCABIES (ode No 110 281)

A mmo derm tit s ed by i festation with Sa opt s s b nd h t i d by m ll p u t si l s pust les a d c i t on fo d most f equently in the f g r w bs body flex butt cks nippl nd g nit lia Th f m l mit can be d m t ated th ki lesi Sc bies is f u d mo t f que tly u d nhyg c d t ons w th h t ry of po r to ab s Thi i f t ti se ms to b dis pp ng in th U S A

T tm t

A G l M s es N e i d t d unl ss seve e s cond y pyod m i p ent This m y eq ir yst mi ti f cti g nt pr t o with th ant s bet tr atm t

B Loc l M a r U le s t ons ar compl ated by e re se o da y py d m t eatm t i d ect d p m ly t wa d di i f st tion If s o d ry pyoderm p t P tass m Pe mang te U S P so ks (1 10 000) 1/2 h b i d t t i d m y b indicated b fo defi t v t tm nt

C D f tiv M s

1 G mm Be e He a hlo id U S P (Gamm ® Kw ll®) 1% n c e m b s 2 o appli d a h n ght for 3 ght (℞ 40 p g 104) It m y b d th p e c of i f t on It is n w id d to b th t atme t f ch ic

2 S lfu t atme t (tio l m thod now ob ol t)

P l mi a y b thing H p ti t tak a h w nd cr b vigo o ly with hot s p d w t

b S lf o tm t 4 5% r bbed in th o ghly f om k d wn to t e h ight f 3 5 s c v n ght

g l d b thi g f t t p t t ot to ch ge

5 Socks should be changed frequently
6 Dusting and drying powders p r n (see page 99)
7 Place small wads of cotton between toes at night

B Local M sures *Do not overtreat*
1 Acute stage (This will vary from 1 10 days) Treat as for any acute dermatosis using soaks (see page 98) for 20 minutes b i d or t i d If secondary infection is present use 1 10 000 Potassium Permanganate U S P soaks If secondary infection is sev re or compli ated treat as p r directions on pages 84 86
2 Subacute stag Any of the following m y be used
a Zincundecate ointment b i d
b Whitfield s ointment 1/4 1/2 strength (℞ 34 page 104)
c Sol of coal tar 5% in starch lotion or ℞ 17 page 100
d Coal tar 1 2% in Lassar s paste
3 Chronic stage Use any of the foll wing
a Iodine as 0 1 1% tincture paint on areas daily
b Whitfield s ointment 1/4 1/2 strength (℞ 34 page 104)
c Compound U d cylenic Acid Ointm nt N F b i d
d Alcoholic Whitfield s solution (℞ 46 page 105)
e Carbol F chsin Solution N F (C stell n s paint)

C M han cal Me su s Remove or debride dead or thi kened tissues after soaks or baths by careful manual technics

D X r y therapy may be of value when hygienic and chemical mean f il Must be given only by trained personnel

DERMATOPHYTIDS (Allergy or Sensitivity to Fungi)
(code No 111 2115)

An erythematous vesicular or ec ematoid dermatitis of hands (and l ss commonly of other skin areas) occurring secondarily to a tec dent f ngal infections and pa ti ul rly follow ng o ertreatment of such infe tions Th id reaction will vary i seve ty with th acti ity of the loc l le ons Fungi a e pres nt in th p imary l sion but are not p e ent in the secondary l s on Tri hophytin 0 1 cc intracut neously ho ld gi e a positive ea t on (It is read in 24 to 48 hou s like a t b rculin test)

Tr atm nt
A Gen r l M sur s None
B Loc l M su es
1 T eat lesions according to type of dermatitis (se pp 96 97)
2 Treat primary focus as indicat d

Prophylaxis
S G ner l Meas res on page 86

TINEA UNGUIUM OR ONYCHOMYCOSIS
(code No 170 2)

A destructive condition of one or more (but rarely all) fing r nails or toenails which b gins at th lateral borders and oft n eventually causes deformity and even *separation of th nail pl te* Diagnosis should be *confirmed* by demo strat

GENERAL RULES GOVERNING CHOICE OF TREATMENT OF VARIOUS STAGES OF DERMATOSES

Stage	Recommended Medicaments		Page
ACUTE LESIONS Characteristics Rapid onset, redness, burning, swelling, itching, blistering and oozing	Wet preparations	Soak For lesions localized to extremities	98
		Wet dressings For localized lesions of head, neck, trunk or extremities	98
		Baths For generalized lesions	66
SUBACUTE LESIONS Characteristics Intermediate duration, subsiding lesions and less angry in appearance	Shake lotions		100
	Emulsion		100
CHRONIC LESIONS Characteristics Longer duration, quite thickened, encrusted, fissured and scaly	Hydrophilic Ointment		103
	Paste (high powder content)		103
	Creams (contain water)	Cold creams	103
		Vanishing cream	103
	Greasy Ointment		104

Exact directions for choice of treatment will vary with the individual case. This will depend upon a wide variety of factors, including characteristics of the dermatosis, extent of lesions, general character of patient's skin, previous medication and drug allergies.

clothing or bed linen and not to bathe *during t s period*

d Final bathing On the dav after the final s lf r rub in struct the patient to t ke another scrubbing with hot soap *and water in a shower and to chang* to all clean personal clothing B d linen *must also be changed*

e Soothing lot ons It is often nec ssary to pres r be soothing baths (see page 86) and shake lotions (℞ 14 15 16 page 100) fr qu ntly following the treatm nt in certain patients with *sensitive skins*

f Personal lothing and bed l nen *must be la ndered or* cleaned

Prophylaxis

A Good hygiene

B Avoid intimate contact with infested ndı iduals

PEDICULOSIS

N me of D s ase	Synonyms
1 Pediculosis p bis (code No 110 292)	Pubic lot se (c abs)
2 Pediculosis corpor s (code No 110 2912)	Body lous
3 Pediculosis capitis (code No 110 91)	H ad lous

Diagnosis

Diagnosis s d pendent po d monstration of lic or n ts (eggs) with evidence of pruritic dermat tis Scratch marks and pyode ma often tend to obs ur primary pun ta

Tre tm t

A D f n tive Treatment 10% Chlorophenothan U S P (DDT) in talcum or pyrophyllite is extrem ly ff cti all forms f pediculosis

1 Scalp Dust 2 5 5 0 Gm (37 1/2 75 g) well into scalp and distribute venly o er scalp In t uct patient not to w sh hair for 1 w k *Rep at tre tment at e d of 2 weeks*

2 *Body* Eith r powder or spray an b used

a Dust powder enly o e body urfac M y take 5 10 Gm (75 150 gr)

b ℞ Chloroph n thane (DDT) 6 0 ı
Ethyl aminobenzoate (Benzocain ®) 12 0 3ii
Tw en 80® 14 0 3ii ss
B nzyl benzoate q s ad 100 0 xx

Sig Dilute 1 part of this solut on w th 5 p rts of water Spray all hairy parts of body with about 20 c of liquid Protect the eyes (*CAUTION* Be zoca ne® is a se sitizer)

3 P bis Dust powder lo lly and distr bute ev nly Allow powder to remain for 2 3 days Wash off w th soap and water Re examine in 1 week and reapply if nece sary

B Gen ral Measure

1 Thorough bathi g with hot soap nd wate

2 Disinfestatio of d scarded clothi g in as of body li Autoclaving or suitable lau *dering methods must be used*

3 Hairy areas in se ere in ol em nt may ne d to b lipped

4 Treat d rmatitis (see pages 83 and 86 97

N me	A ti n	Pre iption	Te hni
E Hydrophili Ointm t U S P	V hicl f r wat ol bl medi ti For pso i is or sebo he Fungi id For e zem	One m y add 5% mmoni ted m rcury 1% s li yl c a id 3% ulf r 5% d terg t soluti n of oal t	Apply pari gly with fing tips b i d
F 3% S licylanilid N F in Ca bowax 1500®	Fo tin cap tis	Disp e 60 Gm o ℥ii (ointment)	L lly b i d to e tire scalp (It is not necess ry t clip the hair)
G G mma Be z e He hlorid U S P	For sc bies and p dicul sis	D sp ns 30 Gm or ℥i	L cally b i d fo 1 to 3 d ys
H Aq eous n my in (0 1%)	Fo pyoderm s	℞ N omycin 0 12 gr ii Di till d wat q ad 120 0 ℥iv	Apply with cotton b i d to q i d
I Methylrosaniline Chloride U S P (G tian i let)	Fo moniliasi	Di pe se 30 c or ℥i f 1% aqu ous luti n	Pai t on with ppli tor o c d ily
J Para amin be oic Acid N F in mul io b s (10%)	Pr tect from ctinic ys	D pe e 60 Gm or ii	Apply to expo ed s rfa s ach mor ing
K Lassa s P ste (Zinc Oxide Paste U S P)	P ote tive and so thing	Di pe se 30 Gm o ℥i	Locally b i d

USEFUL MEDICATIONS FOR SKIN DISEASES

Name	Action	Prescr pti n	Techn c
A St h and soda baths	Clean ing and oothing	1/2 cup ach of co nstar h and oda to a tepid bath	No soap The patient is bathed for 15 minutes th n dabbed (not rubbed) dry
B Cool wet dressings B ric Acid U S P B P	Cooling soothing antiprur ti	1 Tbsp to 1 qt or 1 liter of co l w ter	Wri g out a washcloth or turkish towel and lay on the affected areas 15 minutes twice a d y or continuously Use no waterproof covering as one of the chief us s of these agents depends on the cooling ffect of evaporation (Note Boric acid and potassium p ma ganate are poisons and should not be us d internally or on large denuded a as)
b Alum um Ac tat U S P	Cl ansing mildly astringent	Domeboro® powder 1 tsp to 1 qt r 1 l t r of cool water	
c Pota s um Perma ganate U S P B P	Deodorizi g	On 0 3 Gm (5 gr) tablet d solv d in 1 qt or 1 liter warm w ter	
C Hot w t dr s ings Magnes um S lfate U S P B P	P om tes blood flow Lo lizes infect ons and a ds ph gocytosis	2 Tb p to 1 qt o 1 lit r of hot water	Apply s above using washcloth or turk h towel
D St rch U S P B P (Add 5% d t rge t soluti n f coal tar)	Sooth g and drying (Keratoplast c and h aling)	℞ Sta h 36 3 x Zinc oxide 36 3 x Glyc in 18 3iv L me w t q s ad 180 3 1	Apply with cotton b i d

Type of Skin L sion	E ample	M thods of Loc l T atm nt Always t at the st g a w ll s typ of d matitis
5 Ulcer Simpl s perfi ial D ep pyog nic De p no py g	Simple o i t on Tropical ulc r T ph l r	W t d ing anti inf tiv lutions and ointments
6 U t l l s Simple wheals Angi oti d m	Hives Angion oti dem	Ant p uritic soothing bath and sh k l t on
7 Fi s	Simple fiss r	S l e itrate tic applicati ns and ointm nts (oid w t d ings)
8 E ust d lesio s Se ous cr sts Inf cted cr sts	Eczema Impetig	Wet dressing debridement follow with h ke lotion and gr ase l s ointm t Wet dr s i gs debrid m nt *follow with anti infective solutions* and ointm nt
9 De q m ting lesi Adh t scal Non adh ent scal s (xfoliati g) G sy s l s	P iasis Exf liati e dermat tis S b h a	Keratolytic and l ter keratopl stic agents W t dressings baths shake lotions em lsio s and later gr as I as ointm t Keratopl stic ag ts
10 Mac ated l s	I t rt go	Wet d gs sh k lotio and p wd rs

METHODS OF LOCAL TREATMENT OF VARIOUS TYPES OF SKIN LESIONS

Type of Skin Lesion	Example	Methods of Local Treatment Always treat the stage as well as type of dermatitis
1 Macules		
Simple erythema (asymptomatic)	Drug erythema	Soothing wet dressings or shake lotions
Burning erythema	Sunburn	
2 Papules		
Maculopapular lesions	Pityriasis rosea	Mild keratoplastic lotions and ointments
Papulosquamous lesions acute	Psoriasis	Soothing wet dressings or shake lotions
chronic	Psoriasis	Keratoplastic and later keratolytic agents
Acneiform lesions	Acne vulgaris	Keratolytic and astringent agents
Lichenified lesions	Lichen planus	Keratoplastic and later keratolytic agents
Verrucous lesions	Verruca vulgaris	Keratolytic and caustic agents
3 Vesicles		
Multiple vesicles or diffuse weeping lesions	Eczema	Soothing wet dressings during daytime and shake lotions or pastes at night. As process subsides, change to pastes and creams
Herpetiform lesions	Herpes zoster	Shake lotions or wet dressings
Bullae	Pemphigus	Wet dressings, debridement, shake lotions
4 Pustules		
Impetiginous	Impetigo	Wet dressings, debridement, anti-infective powders, solutions, and ointments
Ecthymatous	Ecthyma	Wet dressings, debridement, anti-infective powders, solutions, and ointments
Furunculoid	Furuncle	Warm moist compresses. Incision (only when ripe) and drainage (caution on lesions above lip)
Follicular	Sycosis barbae	Wet dressings, anti-infective solutions and ointments

Ag t	Act n	Rang f C nc n tratio s U d	Mo t Common Str gth U d	P ep tion of S ut n f M t Comm ly Employ d St e gth
℞ 7 Me ury Bi hlorid N F sm ll po t bl t	Ast g t Ant ptic		*1 10 000* (0 01%)	O t blet $HgCl_2$ to 1 qt o 1 l t w t *Poison Do not use on denuded areas*
℞ 8 Pot i m Pe manganat U S P B P	Antiprur t Oxidizing Ant pt A tringe t	1 10 000 1 400 (0 01% 0 25%)	1 10 000 0 01%	One 0 3 Gm (5 gr) t blet KM O_4 to 3 qt o 3 liters wate or 0 1 Gm (1½ gr) $KMnO_4$ to 1 qt or 1 lit r water

POWDERS

Na ne	P ipt on	In tructions and Rem ks
℞ 9 Abso b bl Gelat Sp ge U S P (o et it)	G lf am® powder 10 0 Gm	Fo leg ulcers and the indole t ul ers It is absorbable hemostatic gelati Apply b i d
℞ 10 Talc U S P (t lcum)		Simple du ting p wder
℞ 11 Foot powd imple	℞ S licylic cid 1 0 g x Bor c a d 1 0 gr x Talc m *100 0* 3xxv	Simple powder
℞ 12 D ting powder antipru itic	℞ Camphor powd r d 2 0 6 0 3 s iss Zinc o ide powder d 16 0 3iv Starch powdered q s ad 100 0 3xxv	S mple antipruritic powd r
℞ 13 Chlo oph notha e U S P (DDT)	℞ DDT 10 0 3i s Talcum q s ad 100 0 3xx	Sig Apply ½ to 1 o over the entire ur face of underw ar and t eat s ams on inside of shirt a d trousers Remarks Effective against all p dicul is

SIMPLE SOLUTIONS FOR SOAKS AND WET DRESSINGS

Indicat ons *For acute red swollen itching infected weeping or vesicular lesions*

Te hnic Solutions must be appl ed cool (hot for inf ctions)

(1) Basin soaks (2 5 quarts of solution) for hands and feet 1/4 hour b i d

(2) W t d es ing for localized l s ons use turkish towel keep saturated with solution

( ) Open dr ssings for ery acute l sions and when marked cleans ng and soothing action is desired Frequent applications are nece sary (i e for 1/2 hour b i d to q i d)

(b) Covered dressings should not be used

All of the solutions have a drying, soothing and cleansing action in addit on to those mentioned

Ag nt	Action*	Range of Con en tr tions Used	Most Common Strength Used	Preparation of Solution of Most Commonly Employed Strength
Plain tap wate	(S bove)*			
℞ 1 Sodium Chloride *U S P B P*	(S e above)	6 1 000 15 1 000 *(0 6% 1 5%)*	0 9%	2 1/4 dr (2 tsp) NaCl to 1 qt water or *9 Gm NaCl to 1 liter water*
℞ 2 Sodium Bicarbo nate U S P B P	Antipru itic	1 50 1 23 (2% 5%)	3 0%	7 1/2 dr (8 tsp) $NaHCO_3$ to 1 qt water o *30 Gm $NaHCO_3$ to 1 liter water*
℞ 3 Boric A id U S P B P	A t pru itic	1 50 1 25 (2% 4%)	3 0%	7 1/2 dr (8 tsp) H_3BO_3 to 1 qt wat r or 30 Gm H_3BO_3 to 1 liter wat r
℞ 4 Magnesium ulfate U S P B P	Antip uritic	1 50 1 25 (2% 4%)	3 0%	7 1/2 dr (8 tsp) $NaHCO_3$ to 1 qt water or 30 Gm $NaHCO_3$ to 1 l t r water
℞ 5 Alumin m S b a etate Sol U S P	A tringent	1 200 1 10 (0 5% 10 0%)	5 0%	4 Domeboro® tablets or 50 cc Burow s ol (N F) to 1 qt or 1 lit r water
℞ 6 Silver Nitrate U S P B P	Astringent Antiseptic	1 10 000 1 200 (0 01% 0 5%)	1 400 0 25%	10 cc of 25% $AgNO_3$ s lution or 2 5 Gm $AgNO_3$ to 1 qt or 1 lit r of water

Ag t	A tion	R ng of Con n t ti U d	M t Comm St gth U ed	P p tion of S l ti f M t C mmonly Employed St e gth
℞ 7 Me ry Bi hloride N F small po son tabl ts	A t i g t Antis pti		1 10 000 (0 01%)	O t blet $HgCl_2$ to 1 qt or 1 liter water *lotion* *Do not use on denuded areas*
℞ 8 P tassi m P r mang n te U S P B P	A tipr iti Oxidizing Antis pti A tring nt	1 10 000 1 400 (0 01% 0 25%)	1 10 000 *0 01%*	One 0 3 Gm (5 gr) tabl t $KMnO_4$ to 3 *qts* or 3 lit rs water or 0 1 Gm (1½ gr) KMO_4 to 1 qt 1 liter wat

POWDERS

Name	P scriptio	Instru ti s and Remarks
℞ 9 Ab orb ble Gelatin Spo g U S P (ster l)	G lf m® powder *10 0 Gm*	For leg *ulcers and other* i dolent ulc rs It is absorbable hemo tatic gelatin Apply b i d
℞ 10 Tal U S P (t lcum)		Simpl d sting powde
℞ 11 Foot p wder simple	℞ S li ylic acid 1 0 gr B ric a id 1 0 gr xv Tal um 100 0 ℥ xv	Simple powder
℞ 12 Du *ting powd* atipruritic	℞ Campho powdered 2 0 6 0 ℈ss iss Zinc oxide powd red 18 0 ℥iv Starch powd ed q s ad 100 0 ℥ xv	Simple antipr *ritic powder*
℞ 13 Chlorophenoth e U S P (DDT)	℞ DDT 10 0 ℥iiss Talc m q s d 100 0 ℥xxv	Sig Apply ½ to 1 z over the entire sur fac of und rw ar and treat s ams on inside of shi t nd t ousers Remarks Effective ag i st all pediculosis

LOTIONS AND EMULSIONS

Liquid mixtures containing m dicaments in oluti n and/or suspension Useful in a wide variety of localized and generalized skin lesions because of eas of applicati n and remova They have a marked drying effect and must be avoid d if this effect is und si able The following are some u eful well known lotions

Lotion and Action	Prescription	Instructions and Remarks
℞ 14 Calamine Lotion L S P (soothing drying)	℞ Prepared calamine 10 0 3 iss Zinc oxid 10 0 3iiss Gly erin 7 5 3ss Magma of bentonite 31 0 3viiss Lime water q s ad 1 5 0 3xxxi	Sig Apply lo ally t i d q i d or p r n Remarks *Use for acute dermatitis* Avoid excessive drying by prolonged u e of this lotion (as with other non oily lotions) Add 1% pl nol for antipruritic effe t
℞ 15 *Starch l tion* (antipruritic soothing drying)	℞ *St rch corn* 24 0 3vi Zinc oxide 24 0 3vi Glyc rin 1 0 3iii Lime water q s ad 120 0 3iv	Sig Apply locally b i d and p r n Rema ks *Use for acute dermatitis* Us ful basic lotion to which other ag nts may be added
℞ 16 *Oily lotion* (soothing drying lubricating)	℞ Zinc oxide 10 0 3iiss Olive oil Lime water āā q s ad 120 0 iv	Sig Apply lo ally t i d q i d or p r n Remarks *U e for acute dermatitis* Less drying than ℞ 14 and 15
℞ 17 Coal tar loti n (soothing drying keratopl stic)	℞ Sol coal t r 12 0 3ii Zinc oxide 24 0 3vi St ch 24 0 3 i *Glyc in* 36 0 3ix Water q s ad 120 0 3iv	Sig Apply locally at night Scrub in a m Remarks *Use for subacute de matitis* *Usef l mild stimu ating lotion*
℞ 18 Sun screen lotion (protective)	℞ Para amin benzoic a id 3 0 3i Emulsion base q ad 30 0 3i	Sig Apply locally to skin before ach x *posure to th sun*

Lotion and A ti n	Pres iption	In tru ti s and Rem ks
℞ 19 Acne lotion	℞ Sulf ppt — Zi c ulf t ― 3 6 ʒi Sodium borate Zinc oxid ⅂ 6 0 ʒiss A to e 30 0 ʒi Camph r water Rose water āā q s ad 120 0 ʒi	Sig Apply loc lly t night R m ks *For acne*
℞ 20 S lfur reso inol lotion (d ying antipruriti fungi id l k r tolytic)	℞ Sulf ppt 4 0 i Resor i l 2 0 ʒ s Zinc ide 25 0 ʒvi Talc 25 0 ʒvi Bento ite 5 0 ʒi Al ohol 50% q s ad 120 0 ʒi	Sig Apply lo ally at night Sc ub in a m Remarks *For subacute and chronic dermatitis* The sulfur and resorcinol conc tration may be do bled or t ipled if more stimulating effect is d ired
℞ 21 T scalp lotion (kerat pl stic)	℞ Sol c al tar 20 0 ʒv Cast r oil 8 0 ʒii Alcoh l 95% q s ad 120 0 ʒiv	Sig Rub small quantity into scalp at night Rema ks All purpose scalp loti n
℞ 22 Me ury alicylic hair lotio (k atopl stic)	℞ Me ury bichloride 0 1 gr iss Sali ylic acid 3 0 gr xlv Alcohol 50% q ad 120 0 ʒiv	Sig Rub small q antity into calp at night R marks All purpose scalp loti
℞ 23 Und rarm loti n (antip pi ant)	℞ Al minum chl ide 60 0 ʒii Gly erin 30 0 ʒi Distilled water q s ad 240 0 ʒviii	Sig Apply sm ll quantity to u derarms ea h m rning R marks U eful antipe spirant

OINTMENT BASES

<u>Indications.</u>

1 To o r ct fat deficiency in a *dry skin*
2 To *provide me* hanical protect on to the und rlying lesion
3 To help abso b or imbibe transudates from underlying l sions (This holds *true only* for the hydrophilic *pr* parat *ons*)
4 To pply active *medi* In l agents to the skin

<u>Contraindi ations.</u>

1 Acute inflamed oo ing lesions
2 Hairy ar as (*except the hydrophilic preparations*)

Prepar tion	Pre cription	Pharmacological Properties
OINTMENTS		
℞ 24 Petrolatum Whit U S P Whit S ft P r ff B P		Chemic lly inert Retards *pe etration* of incorpo ated *medicaments* in some cases
℞ 25 P trolat m Hyd oph l c U S P	3% holest rol n p trolat m white wax and st aryl l ohol	Fa *ors pe etr* tion of inco po ated m dic *ments* Imbibes water (hydrophilic)
℞ 26 Wool Fat Hyd o s U S P B P (lanol)		Adhe es well to skin stable *favo s pene* tr tion Wat h *fo sensiti* ation
℞ 27 Wool Fat U S P B P (a hyd ou l *ol n*)		Imbibe wat r Favors pen tration W t h *fo* sen iti tion
℞ 28 Zi c Oxid O ntme t U S P B P	20% zinc oxid in liquid pet o latum wool fat wax and white petrol tum	M chanical prot ction imbib s wat r stiff ns ointment (gives body to ointme t) Mak s it stick
℞ 29 Th obrom O l U S P B P (Cocoa b tte)		Melt at body temp 1 s

P p t	P pt			Ph m log l P op t
CREAMS (C t in w te)	Ad ant g M e ft ing and oothing than ointm nt			
℞ 30 Hyd ophili Oi tme t U S P	℞ M thylp rab P opylpa ben St a yl al ohol White p t ol tum Pr pyl e gly l Polyoxyl 40 stearate P f d w t r q ad	0 025 0 015 25 0 25 0 12 0 5 0 100 0	g 3 8 gr 1/4 3 i 3vi 3iii 3 1/4 3 v	F vo s p t ti n imb b w t good v hi l for w t r s l ble m di aments
℞ 31 R s w t O tme t U S P	℞ Sperma ti Wh t w x Expr ed alm nd oil S dium b te Ro e wat D still d wat Ro oil	12 5 12 0 56 0 0 5 5 0 14 0 0 02	3i i 3iii 3xi gr viiss 3il/4 3iiis ɱ1/3	Cold c m (wat n oil) ooling nd soothing eff t
℞ 32 Em lsi n b se	℞ Dup l® C C tyl lcohol St yl l hol White p tr lat m H avy liquid petrol tum Butob n® Di till d w te q s ad	1 6 7 0 7 0 20 0 2 0 0 05 100 0	g x v 3i3/4 i3/4 3v s g 3/4 3 xv	Non h ating and n ritat g L messy than oth r creams and oint m nts
PASTES (High p wder nte t)	Promote ev porat n a d cooling d c ase v sic l ti n			
℞ 33 Z Oxide Past U S P (L s r P te)	℞ Zin xide Sta h P t olatum wh te q ad	25 0 25 0 100 0	3vi 3vi 3 xv	Mechanical prot tive Increa es adhe ion b t d c eas s pe t ation of m dicam nts (Add 2% choles terol or 5% c tyl alcohol to increase w ter imbibing power)

OINTMENTS, MISCELLANEOUS STANDARD PRESCRIPTIONS

Common Name	Prescriptions	Instructions and Remarks
℞ 34 Ointment of Benzoic and Salicylic Acid U S P (Whitfield's)	℞ Benzoic acid 6 0 ℨiss Salicylic acid 3 0 ℨ3/4 Polyethylene glycol ointment q s ad 100 0 ℥xxv	Sig Apply locally to skin at bedtime Remarks Effective fungicide Often best prescribed in 1/2 1/4 strength Not for acute or subacute lesions
℞ 35 Aluminum Acetate ointment (1 2 3)	℞ Aluminum acetate Sol N F 10 0 ℨiiss Wool fat 20 0 ℨv Zinc oxide paste 70 0 ℥i	Sig Apply locally to skin p r n Remarks Valuable on receding inflammatory processes
℞ 36 Sulfur salicylic acid ointment	℞ Sulfur 1 0 3 0 gr xv xlv Salicylic acid 1 0 3 0 gr xv xlv Petrolatum q s ad 100 0 ℥xxv	Sig Apply locally to skin p r n Remarks Potent fungicidal combination NOT FOR ACUTE OR SUBACUTE LESIONS
℞ 37 Calamine cream	℞ Hydrophilic ointment U S P 33 0 ℨviii Calamine lotion 66 0 ℨxvi	Sig Apply locally to skin p r n Remarks Good general purpose cream Useful vehicle for water soluble agents
℞ 38 Ammoniated Mercury Ointment U S P	℞ Ammoniated mercury 5 0 gr lxxv Liquid petrolatum 3 0 ℨ3/4 Petrolatum q s ad 100 0 ℥	Sig Apply locally to skin p r n Remarks For seborrheic dermatitis and psoriasis
℞ 39 Kaolin and sulfur ointment	℞ Kaolin 10 0 ℨiiss Sulfur ppt 10 0 ℨiiss Zinc oxide oint q s ad 100 0 ℥xxv	Sig Apply locally at bedtime Remarks A good substitute exfoliating paste for acne
℞ 40 Gamma Benzene Hexachloride U S P (Kwell®)	℞ Kwell® ointment 60 0 ℥ii	Sig Apply as directed Remarks Useful scabicide

SOLUTIONS TINCTURES AND PAINTS

Nam	P e cription	Rema k
℞ 41 Methyl l Chloride U S P (G nt an vı l t) C yst l V l t B P	1 0% qu ol t o	Ant pt (gram positi e gani ms) d fu gicide (monili)
℞ 42 S d m Th lf te U S P	10% q l t	F g d (p lly T c lo)
℞ 43 S l N t t U S P B P	1 10% aqu s l t	U f l auteriz g and t g t l t f l u and ulcers
℞ 44 Ch y bın U S P	4% ın hlo fo m	F r m l l p y hi
℞ 45 N t om l N F (M t ph ®)	0 5% (1 200 t ct)	B cler ost t c and g m d l agent
℞ 46 Alc hol c Wh tf ld l t	℞ S l yl d 2 0 3ss B zoi ac d 4 0 3i Al h l 40% q s ad 120 0 3	Apply l lly to sk n Effe ti fungi idal combin tion M y substit t b y rum for al oh l
℞ 47 B o C mpound Tın t f, U S P, B P	F ll t gth	Usef l t g n h for ab d d fi sured l t d reas
℞ 48 S ft S p Linim t U S P Li ime t of S p B P	U S P 65% p B P 8% o p (l k wn as tinct of g o p)	U ful dete g t
℞ 49 T th lamin m l ion	℞ T than l m 4 0 3 Oleic ac d 8 0 3i Mi l oil q s ad 100 0 3 v	Add up to f e pa t of water to m ke shamp o
℞ 50 Nystati N N D (Myco t ti ®)	℞ My tatin® Or l t bl ts (500 000 its per t blet) V gi l n ts (100 000 units) O tme t (100 000 ts per Gm) D st ng p wd r	T tment f choic f r mo ili sis

DERMATOLOGIC MEDICAMENTS

The following drugs may be incorporated either singly or in combination in the lotions, emulsions and ointment bases listed on pages 100 and 102. In general it is preferable to make prescriptions as simple as possible. *The pharmacological action of the various drugs depends not only on the inherent chemical characteristics of the agents but also upon their concentration.* (E.g., salicylic acid is astringent at 2-3%, keratoplastic at 4-6% and keratolytic at 6-10%.) Often several alternate drugs may be used to achieve a common desired result. Preference for certain drugs may be based on actual superiority or only upon tradition. *Agents and concentrations employed* will depend upon the clinical characteristics of skin lesions and upon individual variations in tolerance. It is usually desirable to begin with weaker concentrations and to increase strength as indicated.

**Cannot be prescribed in cream bases*; only in the hydrophilic bases (e.g., Aquaphor®, Eucerin®, Carbowax 1500®).

Type of Drug	Name of Drug	Concentration Employed
ASTRINGENT and/or DRYING (For acute and subacute eruptions.) These agents act by drying or hardening the skin. *Do not use salicylic acid or tannic acid on denuded areas.*	Aluminum Subacetate Sol., U.S.P. (1:10 Sol.)	15-20%
	Bismuth Subcarbonate, U.S.P., Bismuth Carbonate, B.P.	3-15%
	Boric Acid, U.S.P., B.P.	4%
	Calamine, U.S.P.	17%
	Kaolin, N.F., Heavy Kaolin, B.P.	10%
	Salicylic Acid, U.S.P., B.P.	2-3%
	Tannic Acid*, N.F., B.P.	1-10%
	Zinc Oxide, U.S.P., B.P.	20-25%
	Zinc Sulfate, U.S.P., B.P.	2-3%
KERATOPLASTIC and MILDLY STIMULATING (For subacute and chronic eruptions.) These agents produce a counter irritation of the skin, causing inflammatory exudates to subside and reducing the thickness of the skin.	Ammoniated Mercury, U.S.P., B.P.	2-5%
	Anthralin, N.F. (for psoriasis)	0.1-0.25%
	Iodochlorhydroxyquin, U.S.P. (Vioform®)	3%
	Resorcinol, U.S.P., B.P.	0.25-4%
	Salicylic Acid, U.S.P., B.P.	4-6%
	Sulfur, Precipitated, U.S.P., B.P.	1-6%
	Tars: Coal Tar Solution, U.S.P.	3-10%
	Coal Tar, U.S.P. (Prepared Coal Tar, B.P.), Pine Tar, N.F. (Tar, B.P.), Juniper Tar, U.S.P. (Oil of Cade, B.P.)	0.5-4%

STIMULATING and/ KERATOLYTIC (For hr i e pti) Th g t t by d s ol ing th h ny l yer of the k a d by m vi g t deb s by desquam tio Th y als i k n l ity	Ammoni t d M y U S P B P	5 10%
	A th li N F (f p)	0 5 1 0% (C tio)
	Ch y bin U S P	0 5 10% (C t on)
	R in l, U S P , B P	5 10% (Up t 40%)
	S licylic A d , U S P , B P	6 10%
	S lf Precip t t d U S P , B P	6 10%
	T C l Ta Sol ti , U S P	10 20%
	Coal T U S P (P epared C al T B P) Pi e T N F (T B P) J ip T U S P (Oil f Cade B P)	5 20%
BACTERICIDAL A id u f p icilli and lf amides in oi tme ts (s tizers)	Amm t d Me c ry U S P B P	2 10%
	Iodochlo hyd yqu U S P (V fo m®)	2 3%
	Oxyt t y l Chl rt t acycli e o T t acy l U S P	3%
	N omy in E yth myc n or Chl mph nicol U S P	1%
	Polymyxin B S lf te U S P w ih B t U S P o O ytet ycli e U S P	
FUNGICIDAL	B o A d* U S P B P	3 12%
	S licyl c A d U S P B P	3 10%
	S lf Pr c p t t d U S P B P	3 10%
	Zi c d te,	5 10%
	Sodi m Pr p t , N F	5 15% O tm t
PARASITICIDAL	Chl phe otha U S P (DDT)	5 10%
	Benzyl B oat U S P B P	15 30%
	Sulf r P p tat d U S P B P	3 10%
ANTIPRURITIC For pe fl r li f f it h i g Alw y d t mine se f p itus fi t	C mph Sp t N F	1 4%
	Co l T Sol t , U S P	3 15%
	Ethyl Amin b te U S P B P (B ocai)	5 10%
	Hyd o ti U S P	1 2 5%
	M thol U S P , B P	0 25 1%
	Ph l, U S P , B P	0 5 2%
	S licyli Acid* U S P B P	1 2%
CAUSTICS a d CORROSIVES	P d phyll m Res U S P	25%
	S li yl Acid Pl st U S P	40%

Chapter 6

DISEASES OF THE RESPIRATORY SYSTEM

UPPER RESPIRATORY INFECTIONS

THE COMMON COLD (code No 300 100)

The common cold is a benign nflammation of the mucous membranes of the upp r respiratory tr ct P t or all of the pper passages may be affected and the manifestation will vary with th areas invol ed the severity of the nfection and the presence of compli ations Th tiology has not be n d t rmined but a virus is frequently sugg ted as the possibl au

The di gnosis i often mad by e clu Colds must be differentiated from the early stages of many of th mmunicabl d sea s which have a similar o set One s j stified in speaking of th common cold or no pecific inf ctions only when no sp if organism can b found and the d s as r main localiz d

A <u>Local M nif stat o s</u> One us ally finds inflamm tion of the mucous memb an s of the in olv d ar as
 1 Acute Rhinitis (ode No 310 100) Nas l congestion and discharge
 2 Acute Pharyngit s (code No 631 100) Sore th oat with pain on sw llowing
 3 Acute Laryngiti (code No 330 100) Ho rseness p in n swallowi g and at times a dry ugh

B <u>*G ner l Ma f t tions*</u> M l ise gen alized a hes and p ins sweating and us ally a mild fever

<u>Tr atm nt</u>

No specific tre tme t is known

A <u>G ne al M r s</u>
 1 Rest *In g ne al adequate r t pr f rably compl t b d* rest for th first 24 48 hou is f utmost impo tan in ther py Pat ents usually fe l m h better and th danger of compl c tio s i appare tly dim nished by this gimen
 2 Fluid Pat ents should b n ou aged to d ink fluids sufficient to prevent dehydration and to m int in a norm l u in output The e *is no evidence that th cou se of the dis e* m y be influenc d in any way by fo ing fluids to p omot diuresis or by inducing diaphore s
 3 D et A p latable well balanc d d et t b preferr d special d ts and fa ting regimes do n t i fl nce alter the cours of the disease

4 Dr gs In gen l t may be stat d th t no drug a e known wh h sh rt the durat n or modify th ev ity of the no pec fic inf tion drugs aim d at preventing compli at s a e f equ ntly of little value

a Alg cs nd antipyr tics Th se r often eful in making the p tient omfortabl exc pt fo the diapho esis that is p duc d in a feb ile patient No n compound any bett than anoth r fo this purpo B cau e of the r l w t xic ty the s licyl tes are p efe ed Aspirin 0 3 0 6 Gm (5 10 gr) very 2 4 hours p n may b g ven

b Sulfon m des Th se of s lfon mid s is ment on d only to b ond mn d Th e a e ve y few if any i di at ons fo the f th e drugs in treatment of the c mm n old Thes drug in n way influ n e th cou e of th d a e m y be tox c and prob bly do l ttl to p ev nt compli at o s Th ppli both to sy tem and local us If omplicat ons do d v lop and a am nabl to lfonam des they sho ld th n be g en

c Ant b ot cs Th e ag nts e of no valu in th t eatment of the nsp if infect n Th y may be of real v l in p e nting ser ompl tion from oc ur ing b t th da g r f nd cing organism res stan e altering the flora f the pi t ry p ss g s r s g d g s n ti at on mak th r r t n use unwis At tim these d ugs m y be us d pr phyl t ally in p tient w th ch onic v l vul h rt d ea to p v nt re u e of heumat c f e a d t p v t ubacute bact l do ard t s f m c ur ing (s e page 172)

d Antihist min M y b of b f t in r lieving th very a ly sympt ms (e g sne zi g and hino rh) There is no id that thes d g abort or alte th course of th mm n old A l ge numb of antih tamin c re mmer ally l bl m y are n w off i lly pt d (U S P o N N D) (s p ge 45)

B L l M u L l m d c t ons hav n influ c on th ou s f the d Th y a u d p ima ly to p mot the comf rt f th p ti nt

1 V s onst to The e mploy d to g ve t mpo y el f f m nas l b truction and/or hin he

a Inhal r (g Amph t min I h lant U S P) may b of b n fit n m ld e

b N s l sp y r d ops 1% Eph d in S lf t U S P in l n 1/4% Ph nyleph in Hyd ochl rid U S P (N o-Syn ph ®) in sali e o Mild N ph olin Hyd hlo d S l ti N F (Pr vi ®) in al e a e t f t y D ot ft ne th ve y 2 3 ho o f p o l g d p od be a v oconst i tor drugs i rt t i g and an se bound ng tion

O l p p tio s an be s d fo mild mo prol g d a t i t a tion N o Syn ph ine® 10 mg (1/6 g) y 4 h r is ff ti n many ase Eph dr n Sulf t U S P Eph drin Hyd hl d U S P B P 25 50 mg (3/8 3/4 gr) alon mbin d with a b bit t m y ls b mpl yed E c v C N S t mulat on should b id d

2 Throat swabs Swabbing the throat w th an ant ptic agent is valueless in comb ting infection or altering the cours of the disease and may be harmful Strong antisept cs may be protein precipitants produ ing necrotic t ss e which can act as a culture medium for pathogenic o ganisms W aker solutions a e washed away in a matt r of min t s
3 Gargling and throat irrigation These are of little v lu in affecting the disease but the heat of wa m non i ritating gargle or irrigation may g ve marked trans ent relief of pain in cas s of cute pharyngitis Solution recomme d d for u e are isotonic s lt solution (1 tsp salt per qt or lite of water) or 5 20% glucose in water (1 4 tsp gluc or Ka o® syrup per cup or 240 cc of wat)

C <u>Cough Medications</u> The cough associated w th n upper resp r atory inf ct on is usually caused by dryness and inflammat on of th posterior pharynx and upp r t achea As s h it repres nt a physiological p otective mechan m against downward dr in age of inf cted m terial usu lly requires no therapy and should never be abolished completely It m y be suppressed if it too exhausting painful prevents l p or s o tr ind at d be cause of oexisting cond t ons (e g imm d t ly p stop ativ ly) It can be alleviated o supp ess d by a number of me res
1 Voluntary suppress on of the cough w ll usu lly prevent much of the coughing
2 Sugar lo ng (gh d ops) e usually so thing to th thro t
3 Inhalation of warm moist air (steam) u ually ry o th ing Compound Benzoin Tincture U S P 1 t p m y b added to ach quart of water b t it s the m st th r than any med cation that gives r li f
4 D ugs for sever oughs
a Cod in Phosphate U S P i the drug of choic It should be g ven al n in suff nt dosage to supp but not to abol sh cough Us l do f th 8 15 mg (1/8 1/4 gr) rally ev y 4 hours p n
b Exp ctorant ough mixtur It doubtful if any of th exp torant ough m d in s have any ff t on incre s ing the bron h al se et n o lt ing th viscidity of the mucus Som of th yrupy o gh mixtu s hav a tem porary oothing action in th o oph ynx but b tt r and more prolong d re ults are obt in d w th sweet ned lo enge (cough drop) The o gh m tu s include Terpin Hydrate Elixir N F syrup of ammoni m hlo rjd Tolu Balsam Syrup U S P Wild Che ry Syr p U S P etc Th action of d i s not enha ed in any way when it is add d to th m xtu es and it c n a w ll be giv n in tablet form

D <u>Local He t</u> Marked lief in th no and throat can often b obt ined from steam inhal tions or exposure to w rmth (hot water bottle or inf a r d lamp ov r the nas l egion)

<u>Treatme t of C mpli ations</u>

The prin p l compli ations of th common old a xten ion to accessory *structure* in di ect contact with the upper pir tory passages or econda y bact ri l inv sion of th mucous memb an s

and ac essory tru tures These usu lly require antibiotics or sul fonam des and may require the atte t on of an otolaryngologist

Prophylaxis

The principal p ophylaxis is similar to that of any contagious disease avoidance of exposure whenever possibl avoidanc of sudd n chang s of temperature and excessi e fatigu Admini tra tion of large doses of any of the vitamins cold vaccin s o ally or by injection gamma globulin or 'hard ning up h ve all pro ed value less in preventing or in alte i g th cour e of th dis ase

ACUTE SINUSITIS (code No 32 130)

The acut infection of the paranas l sinuses following upper r spir tory infections is usually caused by secondary b ct ial in vad s The infecting o ganisms m st frequ ntly are streptococci staphyloc i or pneumococ i

Tr atm t

A Specific Me ur

1 Penicillin is the d ug of ho e sinc most of the organi ms a e peni illin sensitiv It is administer d as follows 300 000 units p nic llin p ocain I M on e or twice daily Oth wide spectrum antibiotics may lso be mploy d

2 Local administ ation of penicillin and other antib ot cs by nos drop and use of negati e p ssure i st ll diff ult to evaluat

B Gen l M u

1 B d r t

2 Local ext rnal h t over the sinuse

3 Analg si A pirin or od ine may be us d

4 Vasoconstrictor drugs Non irritating nos d ops may b u ed to f ilit te d ainag or drug m y be given in tabl t form by mouth for similar ffect (ee page 109)

C Do ot u in trum nts in sinuse during ute sinusiti

EPISTAXIS (code No 301)

Epistaxi no bl d m y be d t a vari ty of diseas s r disorde s

A P d p sing F ctor Blood dys rasias hypert nsion art rio le s p othr mbin defici cy (e g ir hosi of th liver) nas l ul ration na al angioma and rtain of the inf ctious dis as (e g measl s and heumatic f ver)

B P ecip t ting F t External t auma to the no violent blowing f th nose e zing 'picking of no inc eas of existing high blood p s ur r low ing of atmosph ric pr ur

C Loc tion. The bl ding ite i most fr qu ntly on the anterior portion of th asal s ptum l ss often t the nd of the inferio and middl turbinat s and rarely further post rio ly

2. Throat swabs Swabbing th thro t with an ant septic agent is valueless in combating infection or altering th course of the disease and may be harmful Strong anti ptics may be protein precipitants prod cing necroti tissue wh h an act as a culture medium for pathogenic organi ms Weak r *solutions are washed away in a matter of mi utes*
3. Gargling and throat irrigation Th e ar of l ttl value in affecting the disease b t the heat of a warm non irritating gargle or irrigation may give marked transient relief f p in in cases of acute pharyng tis Solutions recomm nded for us are isoton c salt solution (1 tsp salt pe qt or l ter f water) or 5 20% glucose in water (1 4 tsp glucose or Karo® syrup per cup o 240 cc of water)

C. Cough Medications Th cough ass ciated with an pper r sp r atory infection i usu lly caused by dryness and inflammati of the posterior pharynx and upp r trach As such t rep ese ts *a physiological prot ctiv m hanism against downw rd d* ain ge of infected m terial usually requires no therapy nd should nev r be abolish d completely It may b suppress d if it s too exhausting painful prevents sleep or i o t andic t d b cause of coexisting condit ons (g immedi t ly postoperative ly) It an b lleviated or suppr s d by a numb r of m asure

1. Voluntary suppression of the ough w ll us ally pr vent mu h of the coughing
2. Sugar lozenges (cough d ps) are usually s othing to th throat
3. Inhalat on of warm moist air (st am) s usually very oth ing C mpound Benzoin Tinctu e U S P 1 t p m y be *added to each quart of w ter but it th moist rath r* than any med at on that gives relief
4. Drugs for s vere oughs
   a. Cod n Phosphate U S P s the d g of cho It should be given alon in uff cient d g to suppress b t not to ab l sh cough Us al dose for this is 8 15 mg (1/8 1/4 gr) orally v ry 2 4 hou p r n
   b. Expe to ant cough mixtures It s doubtf l if any of the exp to ant cough m dicines h v any ffect on in s ing th bronchial s retion o altering th vi d ty of th mu us Some of th syr py gh mixtur have t m p rary soothing ct on in th o opharynx but b tt r and more p olong d re ult are obtain d *with swe t d* lozenge (ough d op) Th cough m ture in lude Terpin Hyd ate Elixir N F sy p of ammonium hlo ide Tolu Balsam Syrup U S P Wild Cherry Syrup U S P et Th action of cod ine i ot enhanced in any *way when it is* dded to the *mixtu es* and it can as well be given in tablet fo m

D. L al He t Marked r lief in th o and throat can often be obt ined f om steam inhalati ns or xpo ure to warmth (h t water bottl or infra r d lamp ove th nas l region)

Tr atment of Compli ation

Th principal complic t ons *of th* common cold a xt nsion to accesso y st ctures n direct contact w th the upp pi tory passages or secondary b ct ri l inv sion of th mu ous m mbran

and ac essory structur s Thes usually require antibiotics or sul fonamides and m y r quire the attent on of an otolaryng logi t

P ophylaxis

The p incipal prophylaxis is similar to that of any contagious disease avoidance of exposure whenever possible avoidanc of sudden changes of tempe ature and ex essive fatigue Administra tion of large doe of any of th vitamins cold va cines orally or by injection gamma globulin or hard ning up have all p oved value le s in preventing or in alt ring the cour e of the diseas

ACUTE SINUSITIS (code No 32 130)

The cut infection of the paranasal inus s f llowing upper spiratory inf ctions is usually aus d by s condary bacterial in vade The inf cting organisms most frequently ar tr ptococci staphylococ i, or pneumococc

T tment

A Specif M asures

1 P nicillin is th drug of choic sin e most of the organisms are pe i illin ns tive It is administ red a f llows 300 000 units peni illin p ocain I M once or twic daily Oth r wide pectrum antibioti s may also be mployed

2 Local administration of penicillin and other antib otic by nos drops and us of n g tive p ssure is still difficult to evaluat

B Ge e l M u

1 Bed r t

2 Local external heat over th sinus

3 Analg sic Aspirin or codein may be us d

4 Vasoconstrict drugs Non irritating n se drop m y be used to f c lit t drainag or drug m y be given in tablet form by mouth f r imilar eff ct (s e pag 109)

C Do ot instrum nts in sinuse during cute sinusitis

EPISTAXIS (code No 301)

Epistaxis o n bl d m y be due to a var ety of dis ases o disord s

A P dispo ing Fa tors Blood dyscras as hypert nsion arte io-s l ros s p othrombin d fici n y (e g ir hosis of the live) nasal ulceration nasal angioma, and ertain of the inf ct ou dis as (g m asl and rheum t f ver)

B P p tating F tor Ext rnal traum to th n violent bl wing l th nose s ing, 'pi king' of nose inc ase of existing high blood p sur o low ring of atm sphe ic p sur

C Loc tion The bl eding sit is most f equently on the ant rior *portion of th s sal septum le s often t the end of the inf rior* and middl turbin t and ar ly further post rio ly

2 Throat swabs Swabbing the throat with an ant septic ag nt is valueless in combating infection or altering the course of the disease and may be harmful St ong antiseptics may be protein precipitants producing necrotic tissue which can act as a *culture medium for p thogenic o ganisms Weak r* solutions are washed away in a m tt r of minutes

3 Gargling and thro t irrigation These are of l ttle l e in aff cting the d sease but the heat of warm non irrit ting gargle or irrigation may give m rk d *transient relief* of p in in cases of acute pharyngitis Solutions recommend d fo us are isotonic salt solut on (1 tsp salt p r qt or l ter of water) or 5 20% glucose in water (1 4 tsp gl cose or Karo® syrup per cup or 240 c of w ter)

C Cough Med cat on The cough associated w th an upp r respir ato y infection is usually cau ed by d yness and inflammat o of the post rior ph rynx and upper trach a A s h it repre e ts a physiological protectiv mecha sm against downward dr in age of infect d material usually requi s no therapy and should nev r be abolished compl t ly It may be supp essed if it s t o exh usting painf l prevents sl p or s contraind cat d be cause of co xi ting conditions (e g immed ately p tope ative ly) It can be alleviated or suppressed by a number of me sures

1 Voluntary suppress on of th cough will usually prevent mu h *of the coughing*

2 Sugar loze ges (cough drops) a e usu lly soothing to the throat

3 Inh lation of w rm moist air (steam) is u ually v y sooth ing *Comp und B nzo n Tincture U S P 1 tsp m y be* add d t ea h quart of water but it is the mo st ir ath r than any med t on that gives relief

4 Drug for sever ughs
   Codeine Phosphat U S P s the *drug of hoi It* sho ld b given alon in suff ci nt dosag to supp ess but not to abolish co gh Usual dose for th s 8 15 mg (1/8 1/4 gr) orally v ry 2 4 hours p n
   b Expectorant cough mixtures *It i do btful f y of the* expectorant ough medicin s h v any eff t on in r as ing the b n h l s cretion alt ring th vis d ty of th mu us S m of the syrupy o gh m xtu hav t m pora y soothing act on *in* the o opha ynx *b t b tt r and* more prol ng d sults a obt in d w th sw t ned lozenges (o gh drops) The ugh m xtu s includ Te pin Hydr t Elixi N F syrup of amm n m hlo rjd *Tolu Balsam Syrup U S P Wild Ch y Syr p* U S P tc The action of cod ine is not enh n d n any way when it i dded to the e m xture and t an s w ll be given in tablet fo m

D Loc l H at Ma ked r *lief in th* nose and throat an oft be obtained from st am inh lations or expo ur to warmth (as hot water bottle or infr red lamp ove th nasal region)

Tre tment of C mpl cati ns

The princ pal c mpli tions of th common old a xt nsion to ccessory structure in di ct *contact with the pper re pi at y* passages or se ondary bacter al inv sion of th mucou m mbran s

that th maximum d aensit ation may be produ ed

1 Determin th offending allergen This s usually accom plish d by a c r ful history plus skin tests with antig ne of known alle genic activity

2 Cour e of injection of all rgen extr ts The m te ial is gi en subc taneously weekly o bi w kly in in reasing dos ag s An av ag d se sch d le that requir 10 20 weeks for des n iti tion is shown b low (This cou se must be rep t d every year)

Week	Diluti n	Si of Dose	Noon or Poll n U its	Week	Dilution	Size of Dos	Noon or Pollen Units
1	1 5 000	0 1 c	20	11	1 50	0 1 c	2 000
2		0 2 c	40	12		0 2 cc	4 000
3		0 3 c	60	13		0 3 c	6,000
4		0 4 cc	80	14		0 4 cc	8 000
5		0 5	100	15		0 5 cc	10,000
6	1 500	0 1 c	200	16		0 6 c	12 000
7		0 2 cc	400	17		0 7 c	14 000
8		0 3	600	18		0 8	16,000
9		0 4 c	800	19		0 9	18 000
10		0 5	1000	20		1 0 cc	20,000

If a sh rter schedule mu t b mpl y d ne can cut th a bov sch dul in h lf by el min ting the 0 2 and 0 4 c doses in ach s ies How v in so doing uti n must be x ised to a o d ea tion

3 M int nanc dosages When p ti nt h s mpl t d th p ogr m f des n itizat on and hay fev se on has begun dminist 0 2 c f 1 50 dilution of xtra t (4 000 noon units) ery 1 2 we k until eas n is o

4 Continuou desen t t on If p tient e v s 0 2 cc f 1 50 dilut n ev ry 2 w ek throughout the y a the annual b ost c u s can be tarted later b ginning with 0 1 c of a 1 50 diluti n (d 11) and tin ing w th above or a el t d ch dule

5 Attempt at des siti tion on hay fe has begun g n ally m et with little ucces

B G n al M u

1 Drug

a Corti ot opin (ACTH) and the o t on hav be sh wn t give omplet r lief f om alle gi rhiniti within 12 36 hou If th offending llerge s ar p nt wh n th d g is withd awn ymptom usually r turn but om ind vidual with asonal h y f v m y be lati ly f ee f the duration of the h y f er s on

b A tihi tami ic drugs give r lief in 60 80% of pati nts initi lly howev the r ff ti e s t nds to w r off a the on ontinues Many antihistaminics e avail abl all ha imila s d ff ts of lethargy and drow i ne s The dos is ari ble with ome p eparations (p ge 45)

c Ephed in sulf t or ephed in hydrochlorid 25 50 mg

Treatment

A Local Measu es Have patient sit erect with head forward If reclining there is danger of aspiration of blood

1 Pressure over the bleeding site is usually all that is neces sary A small pl dget of otton moistened with hydrog n peroxide will usually stop the bleeding
2 Cauterization When active bleeding h s ceased touching the bleeding point with a bead of chromium trioxide (chromic acid) or trichloracet c acid will usually prevent furth r bleeding Electrocautery is also satisfactory
3 Severe bleeding in th anterior part of the nose can usually be controlled with a tampon introduced through the nostril If bleeding is posterior it may be n c ssary to introduce a posterior nasal pack This is done by the use f two strings attaching one string ne r ach end of a rolled 2 x 2 or 4 x 4 g u e pad A third string is tied at the middle of th rolled pad A soft catheter is then introduced into the n sopharynx through on nostril and pulled out through th mouth The end of one of the first two strings is tied to the oral portion of the atheter and pulled back through the nostril The string is then removed from the atheter and the p oc dure repeat d pulling the s cond tring through the other nostril The pa k is guided through the mouth into th nasopharynx and pulled into place by traction on both strings These are then tied over pad unde the nasal septum The third string is taped to th face and used later to remove the pack Do not leave pack in more than 48 hours
4 Ice packs on the nose or to the back of neck are of no b nefit

B Specifi Me sure Treat the underlying disease

ACUTE TONSILLITIS (code No 634 100)

A ute tonsillitis is an infect on of the f u ial to sils caused by any of a number of organisms It i characteriz d by both loc l and gen rali ed symptoms of varying deg ee

Treatme t

D pends on the causal organism (For streptococ) s r throat see page 461)

ALLERGIC RHINITIS (Hay Fever) (code No 310 392)

Hay fever i an alle gic d s rder which u u lly occurs in spring or summer and is charact riz d by rhiniti n ezing n s l ob struction redness of ey s and itching of a s nose thro t or eyes Pollens ar the most common all rge

T tm nt

A Specif c Mea ur s There is no true sp cif c t e tm nt Hypo sensit tion or d sensiti ation is frequ ntly b nefi i l and consists of administration of gradually incr asing d s s of th allergen (usually poll n) so as to indu an immunity in th s sceptible individual For b st results th rapy hould b start d 3 6 months befo e the on et of the hay fe er s ason so

3 Sle pl sness Pentoba bital Sodium U S P Pentoba bitone Sodium B P 0 1 Gm (1 1/2 gr) at bedtime should be giv n

CHRONIC TRACHEOBRONCHITIS
(Chronic Bronchitis code No 350 100 0)

A ch onic n sp ific inflammation of the tracheobron hi l tr e manif sted by c ugh which is u ually th o ly constant symptom The cough may b prod ti e or non prod tive *Do not diagn se chronic bronchitis on the basis of chronic cough alone Any patient with a chronic cough should be given a thorough examination including a chest x-ray* As a ule a d ag nosi of chr ic bronch tis can be made only by exclusion Prim ry chronic b onchiti is a r re disease alm st all cases of hronic bronchiti are seconda y to other r spiratory conditions or inflam mations Intr table cas s m y h v an all g c basis Physical findings may be absent or a few honchi and wheezes m y b h ard

Tr tm t

A Sp ifi M asu es Th e is no specific treatment for chronic b on hit *Treat the underlying condition*

B G n r l M u

1 Remo e o el min t xciting c us such as sm king ex c siv cold ir damp tmosph re indust i l fum s tc
2 D ug Ephed ine a d simila drug giv by mo th o neb ul tion e g Isop oter l Hyd hloride U S P (Al drine® Isupr l®) gives r li f in many cas wher b o hosp sm i pre e t Potassium Iod de Sol t on N F 5 10 d ops t i d as tole at d may b helpful
3 Ad quate re t in dust f ee room
4 Optimum nutr tion and hyg e

BRONCHIAL ASTHMA (code No 350 390)

B on hial asthma is a ymptom ompl x du to a v ri ty of It is chara t r z d by dy pn a esp i lly of th exp r tory ph with wh zing and whistling which a e d to edema of the bron hi l lining and/o c t tion f th mooth mus les l ding to con trict *on of th b on h*

Di gn s

A H t y of p at d attacks of expir t ry dy p e f quently in an mot on lly l bil patient with a defin te all rgic te d ncy The att cks ar p p tated by xp su to the all rg n o t t mes by ve mot o l at es

B Phys l E amin tion

1 During typ l tta k Examination cha act ristic
   a S v e xpi atory dy pn a and at tim s yanosi
   b Ch t held in p tial inspi at ry position Inspir tion short and xpi ation gre tly prolong d
   d Cough diff ult and m y be ome viole t Sputum thick and t n ious
   f Ch t hyp r sonant to p ussio

with a barbiturate every 4 to 6 hours may gi e relief (see page 109)

d Sedation may be of value if patient is nervous or upset (see page 39)

2 Allergen free atmosphe e

a Dust proof respirator masks can be used during the hay fever season

b Air conditioning equipment to filter the air ente i g the patient s room may prove valuable

c An area free of the offending pollen can be visited during the pollinating period

d When dust is the offending agent prepare a dust f e bed room as follows Cover mattress and pillow witl an allergen free material (plastic or sheet rubber) Remove all rugs carpets drapes bedspreads or othe lint producing materials and remove all ornate furnit re or other objects which are not e sily dust d

e Household pets must be cons dered poss ble sources of allergens

DISEASES OF THE BRONCHI

ACUTE TRACHEOBRONCHITIS
(Tracheitis code No 340 100) (Bronchitis code No 350 100)

An a ute nonspecific inflan mation of the t ache bronchi l tre u ually following an acut rhin tis or pharyng t s nd usually a com panied by a low grade feve A productive or non product v cough is p ese t Phys cal xamination may be entirely neg tive o s attered o rse rhonchi may be he rd over the chest

T e tm nt

A Spe if c M asu es

1 There is no p cific tr atment unless secondary infe tion is present

2 In severe cas s pe i llin by aerosol inhalation (see page 153) several times daily and/or peni illin pr c ne 300 000 units I M on e or twic daily may be f value

B General M asures

1 R st B d r st is most impo tant in shortening the c u s of the disease

2 Control of cough

a Steam inh l tio or e o oli ed water or saline The hacking cough of the drv stage i helped b st by steam in halations in a warm oom Compound benzoin t nct re 1 tsp to each qt (lit r) of water m y be added

b Cod in in small doses 15 30 mg (1/4 1/2 gr) q 3 4 hours *may* be given t h lp control the paroxy ms of coughing

c Ephedrine cough mixture will be h lpful if bronchiospasm is present (manifested by wheezing)

℞ Ephedrine sulf te or hydrochloride 1% Sol	30 0	3i
Cod ine phosphat	0 5	gr viiss
Syrupy vehicle q s ad	120 0	iv

Sig 4 cc (1 tsp) q 3 4 hou s p r n cough

B S e Att k Epın phrine responsive p tie ts (m y also fol low for t tus asthm ti u below)

1 Epın phrin injection ınj t on of adr naline 0 5 1 0 c (8 15 ɱ) 1 1000 solut on ubcut and rep t e ery 30 60 minutes ıf ne essary
2 Ep phrin ınhalati n o isoprote nol (Is prel®) 1 100 by eb l e us g oxyg n for spray m y giv dram t elief M y r p at ev y 30 60 m n tes
3 Epin phrıne in oil 1 500 0 2 1 0 c (3 15 ɱ) I M for p o longed ff ct May h lp pr vent r u ence of att k and an be peated in 10 14 hours
4 Aminophylline (theophylline ethyle d amin) 0 24 0 48 Gm 3 3/4 7½ gr) in 10 20 c (2½ 5 dr) salın lowly I V if attack not cont olled M y al o gıve this as r tal instilla t on or ctal suppository in th same dose
5 S dat on must be ad qu t Us o e of the following
   a Pentoba bit l sod um (p tob biton od um) 0 1 Gm (1½ gr) at on e and may r p t
   b Pa aldehyd 4 8 (1 2 dr) o lly in fruıt juı e or rectally ın 30 cc (1) o 1
6 100% oxygen (r 20% hel m w th 80% oxyg) inhalation by mask at 6 12 l t /mınute may gıv great 1 f f om dyspnea
7 Wh n availabl th se of oxyg n by int mittent posit ve p essur (g B nn tt v lve) and b onchod lating e os ls dminister d s m ltaneously through the sam pp atu al fords the mo t d am ti elief in ac t tt k of thma As a b hod lat isop t r n l (I p el®) to be p e- f d bec e t prod e a lesser d gr of syst m e a t tha d pi eph n
8 The pla f u f e t n n low rıng g ts (g Al va ®) depolym i ing n ym (e g hyalu onidas) o d g tive n ym (g t yp in) by os l in this ond t on i still n t d t min d Th advi ab lıty f ing th l tter h re ntly been q st on d ın v w of t ffects on the morphol gy f the c lls of the e p rat ry linıng as w ll as t r tating lo al ff ct

C St tu A thm ti u and S v Att k ın Epın phrin stant P t t

1 Co t ot opin (ACTH) 25 50 unit of gel p p tion sub t I M o f th t o o lly mm di t ly and p t y 6 ho If th p tie t hosp tali d admin t o ti ot op (ACTH) 20 40 mg ın I V d ip ove 8 12 h pe od v ry 24 h u s ACTH m y h ve a mor p d on t f t on but therwi e both a sbo t qually ff t v Rel f hould b vid t ın 6 12 h e and alm t mpl t f dom f m th all gi manif tations ın 24 48 h u The m di tion h ld p obably b co tin d fo 7 10 d y in g d ally dımını h g d s aft r the first 4 5 day
2 P tient sh uld b h p t li d if po ibl ın an alle g f oom
3 100% xyg n 20% helium with 80% oxyg n should be given by m sk fo li f of dy p
4 Aminophylline (theophylline thyl diamine) 0 24 0 48 Gm

g Chest full of musical rales which frequently may be heard at a distance
2 Between attacks May be entirely negative or show only scattered expiratory wheezes

C Differe ti l D agnosis Many diseases may simulate b onchial asthma Of th se the most important a cardiac asthma and generalized emphysema especially when chronic b onch t s is superimposed The appearance of br nchial asthma in mid dl or old age should make one suspect br nchial neoplasm

Tr atment

A *The treatment may be divid d into two phases*
1 T eatment of the actual attack
2 Interim therapy which is aim d at preventing further atta ks

B Drugs used for the spe ific treatment of asthma In the con trol of the acute att ck certain therapeutic ag nts h ve c me to be lo ked upon as spe if c for rel ef while other prep ration are of value in aborting attacks It is ne ssary to know the prep rations available their mode of administration and the ndications for each The chart on page 118 summarizes the important drugs

Epinephrine (drenaline) is the drug of cho ce for the emer gen y management of acute bronch al asthm However it h s been shown that orticotropin (ACTH) or cort sone can be us d to stop an attack when all other measures f il The onset of action of ACTH and co ti one i mu h slow r than that of epi nephrine but they should b employed concurr ntly with epi nephrine in severe attacks of asthma *Epinephrine must be used cautiously in patients with cardiac asthma hypertensi n or angina*

Treatm nt f the A te Att k *Do not u e morphine*

A M ld o M d rat Att k Epinephrine (drenaline) is the drug of cho e

1 *Epin phrin in) tion (inje tion of adren lin) 0 2 0 5 c* (3 8 ♏) of 1 1000 bcut
2 Epinephrin inhalation (1 100 in aqueo s solut on) by n bu li er every 30 60 minute p r n (see p g 116)
3 Moderat att ck R peat epinephrine (drenaline) ub ut ve y 1 2 hours
4 Epin ph ine n oil 0 2 1 0 cc (3 15 ♏) 1 500 I M may also be g ven at ons t if a prolonged effect is d s ed May repeat in 10 14 hours
5 Am nophyllin (th ophylline thyle d amin) 0 24 0 48 Gm (3 3/4 7½ gr) in 10 20 c (2½ 5 dr) saline l wly I V f tt ck i n t ont olled 0 48 Gm (7½ gr) m y be added to 500 1000 c of salin and given by I V drip M y al o giv thi as rectal inst llation or ctal uppositо y in th sam dose
6 Ephedrin ulfat r hydrochl ride 25 50 mg (3/8 3/4 gr) with or without a b rb turate may r lieve mild attack (e page 119)
7 Rea sur patient that att cks can be controlled
8 Sedat on Ph noba bital (Phenob bitone) 0 1 Gm (1½ g) mmediately may rep at 0 03 Gm (½ gr) q i d

(3 3/4 7½ gr) in 10 20 cc (2½ 5 dr) salin lowly I V and by re tal suppos to y for imm d te r li f of sympt ms 0 48 Gm (7½ gr) may be added to 500 1000 c of sal ne and given by I V drip

5 S dation must b d qu te unt l relief is bt ined U e one of th following
   a Pentobarbit l sod um (pentobarbitone sod um) 0 1 0 2 Gm (1½ 3 gr)
   b Parald hyde 8 15 (2 4 d) in 30 cc (1 oz) o l by rectum
6 Surface t nsion lower ng g ts (Al v ire®) by o ol m y be helpful in s me cases (s p ge 153)
7 If c t t opin (ACTH) or th tisones e not av il ble
   a As soon s pineph in respon veness r turns u e ep phrine as bove Ep n phrin m y be admin stered caut ly 1 c 1 1000 solution in 1 liter of 5% gluc s by int nous d p (60 80 d ops p minute)
   b General an thet ag ts may be life saving
      (1) R t l inst ll tion of 30 90 cc (1 3 oz) of ethe n qu l quant t of ol oil rep t in 12 to 24 hour if nec s y Usu lly pat t wak f e of tta k
      (2) If a t ined an sthet t i avail ble inhalat on th r an the may b empl y d
8 Bron ho copy under g n l ane th ia sometim ind ted t mov t n i u s tions

D G n r l M s es
1 Elim t any kn wn llerg n f om p tie t vironm nt
2 M int in ad q t re t and rel ppr he ion by e ssu an e and d t on
3 Resp t ry inf tions mu t b t e ted vigorously with anti b oti di ted I M or by eros l
4 Fluids orally o p ent rally to pr nt dehydr t

Inter m Th py
A Spec f The py Attempt to d termu wh ch all g pl y a r l and t t co dingly
B Gen r l M e
1 Em tional d st rban e should b orrect d wh v pos bl
2 Good li ing hygi should be p omoted
3 P tie t w th appar tly int in ic thma (usu lly d to inf t on of b n hi) may be h lped by antib ot th apy (e p g 114 and 120)
4 Eph drin hydrochl rid s lf t 25 50 mg (3/8 3/4 gr.) w th or w thout phen b bital (phenob biton) 15 30 mg (¼ ½ g) ve y 3 6 hou may p e ent o r du ecur en
5 Amin phylline phed ine ph n ba b t l p ules

℞ Amin phyllin	0 2	g	iii
Ephed ine hyd ochl d sulf t	0 025	g	3/8
Ph nob b t l	0 015	gr	1/4

Sig 1 p ule ery 4 hou

6 Antih staminic g t may give lief in s m p ti ts b t th i u i bro hial thm ha generally b n quit dis appointi g (e p g 45)

DRUGS USED IN THE TREATMENT OF BRONCHIAL ASTHMA

Preparation	Dose	Mode of Administra tion and I dication
Epinephrine Injec tion U S P Injection of Adren aline B P (1 1000 dilution of the hydro chloride in aqueous solution)	0 2 1 0 cc (3 15 ♏) *m y repeat up to q 30* minutes if necess ry 1 cc (15 ♏) in liter of 5% gluco e solution Give at 60 80 drops per minute	Subcut This i the *most commonly used* preparation I V *Caution* Reserved for ery se vere acute attacks when more conserva tive measu es f l
Epinephrine in Oil Injection U S P (1 500 dilution)	0 2 1 0 cc (3 15 ♏) May repe t in 10 14 hours Duration of action is 3 24 hours	Subcut or I M usually g ven with aqueous pinephrin to patients with severe or curr t thma
Epinephrine Inhala tion U S P (1 100 dilution in aqueous solution) Isoproterenol U S P (Isuprel®) (1 100 dilution in aqueous solution) *For inhalation only*	0 5 cc in n bulizer Individualize dose 4 8 inhalations usually uffice (I oproterenol causes less vasocon st ctor ction)	Glass nebul zer pe ated by hand bulb or pressure from an oxy gen tank or nebuliz r with intermittent posi t v pres ure b eathing (IPPB) (see page 148) Most useful in abo ting attacks
Isop oterenol tab lets (5 10 15 mg)	Sublingual, indivd u ll e d e	May be u ful in aborting attack
Cort cotropin (ACTH)	10 40 mg by continu o s I V drip over 24 hours or 25 mg of *regular or gel I M* eve y 6 hours init lly	De eas to toler ance in p olo ged use Used for s *v re attacks and* tatu asthmaticu
Cortis n	See pag 423	Or lly
Aminophylline Injec tion U S P B P (Theophylline Ethylen diamin)	0 24 0 48 Gm (3 3/4 to 7½ gr) in 10 or 20 cc saline May r p at in 3 4 hours Dur t on *of ction 1 3 hou*	I V slowly May be used with r with out pi ephrine Val uable in sev re attacks *wh n patient is ep* n ph in fast
Aminophylline U S P rectal supp sit ry	1 upposito y e e y 12 hours	Useful only wh n p o long d ffe t is d sir d
Ephedrine Hydro chloride U S P B P or Eph drine Sulfate U S P (cap sule or pill)	25 50 mg (3/8 3/4 gr.) eve y 3 6 hours *May* combine with ph nobarb tal 15 30 mg (1/4 to 1/2 gr) or p ntobarb tal sodium 30 mg (1/2 gr)	Or lly Of little o no us in acut attack *May be of some alue* in aborting an attack or d creasing the number of attacks
Antih stamine drugs	S e page 45 for dosage	Orally Of l ttle u in ute attacks M y *be of valu in aborting* attack o decr a ing umber of atta ks

pn umonitis appears t be of less v lu than dir ct inhal tions

3 St eptomy in aerosol (s p ge 153) m y also be of ben f t in ome pati t espec ally th e in wh m penicillin res st anc urs Ea h cc should cont in 50 250 mg of st pto mycin d pending on c centrat o desired Administer in th s me manner as fo p nicillin (s bove)
4 Combined p ni llin streptomy in aeros l m y be of bene f t in many cases Use th sam o centr tion for th drugs as us d individually
5 Oxyt t a ycline (T mycin®) i also ava lable for a osol admin t t on (50 mg /cc in propylene glycol) and m y be used as abov (See pag 153)
6 En yme by s l may b of value in obtaining bette dr inag of th ck in pi ated mate ial (s page 153)

B G l M s s

1 Postural d in ge Postur l dr inage h s prov d to be the m t effective ingle meas for the symptomat c r l ef of pati t with bronchi tasis Th patient hould assume the po ition that gi es him the maximum d in g and this var with the loc tion of th le ion Exp ien w ll help the pati t dete mine th best po it on to Sinc m st les ons a at the lung b es the most mmon method i f the patie t to lie p on cros the edg of th b d with fold d a ms r st g on a pill w on th floor maintaining this pos t n fo 10 15 min t s Two to four time a d y i s ally suff c t the f r t d ai ag being just upon awak ening a d th last ju t befo bedtime
2 Avo dan of upp p ratory infect on is ve y important in ontrolling th bro hial inf tion
3 Cor t on of as i t d d e Many p t nts with b n chi t is suff from hronic uppe respir tory infections with post as l drip This m t b cor ted wh neve p sibl
4 Climat Although limat does not ur a w m d y li m t oft is of b ef t sp cially in e it t nds t duc the in idenc of upper respi t y inf tions Av id a du ty m ke filled atm ph e
5 R st Pat ent with vere di ease should lway hav ad q te r t in b d for symptoms often am lior at d by this mea ure The f ot of the b d hould be raised 6 to 12 in hes
6 Good nutrition and h alth are v y impo tant Ad qu te food and st w ll aid in lowing the prog s of th d s as Sm king hould b prohibited
7 B on ho op drain g is of v lue in ti tly in all cas s to liminate bron hial tenos o ob truct on cont buting facto It m y b n c s y to dil te th teno d bro hus but peat d bro h c py i not advis d

C S gi l T tm nt Pre ntly acc pted indication in lud

1 Y ung p t nt in good ondition who are having hron o r urring ymptoms of any d gre Mod rn surgery will p mit e tion of f irly xt nsive bilat r l diseas
2 P tie t up to 60 years of age who a e h ving s v e sympt m

7 Patients who are not helped by other meas es may be treated chronically with small doses of corticotropin (ACTH) or one of the cortisones The dosage employed is just sufficient to keep them comfortable and relatively free of symptoms

BRONCHIECTASIS (code No 350 100 6)

Bronchiectasis is a chronic progressive disease of the bron hi and bronchioles characterized by dilatation of the bronchi or bronchioles the presence of varyi g amounts of infiltrat ve infec tion and finally destruction of the involved parts and of the sur rounding tissue The etiology in many cases is unknown but con genital factors and chronic or recurrent pulmonary infections un doubtedly play a role

Diagnosis

A Histo y
1 Chronic cough usually productive of m ch purulent sputum and more marked upon arising in the morning
2 Recurrent attacks of pulmonary infections with aggravated cough, fever sw ats and chills Hemoptysis is common

B Physical Examination Chest findings except in seve e cases o during acute pneumonitis are rarely significant Rales at lung bases and some whisp red pectoriloquy are the most c m mon findings

C Labor t ry Findings
1 X ray Routine h st x rays are usually insufficient to make diagnosis If chest x ray is negative and bronchiect sis is suspected further studies are neces ary
a Bronchoscopic xamination
b Bronchograms (x rays of ch t foll wing in tillation of iod zed oil into bron hi either through bro hoscope o directly into th t achea) are most impo tant f r di gno s s Th s must b made by an expe i nced rad ol gist
2 Sputum Th sp tum is usually found to s par te into 3 laye s Ba t riological studi always r veal mixed infec tions us ally with treptococc and staphylococci predom nating

Tr atment

A Specific Measures Treatme t with antibiotic ag ts has been of benef t in t mpora ily ameliorating symptoms spe ily during th acut xac bations but has had no l ting effect The amount of sputum and cough is r d d and the pat t f ls bett but these benefits wear off in a few w ks to months The t atment should be repeat d as n c ssary and may be of gre t b nef t in milder cases or in debilitated pa ti nts wh re surgery is conside ed too radical a procedure When pos ible predomin ting organ sms should be identified and their sensitivity to the various antibioti s det rmined
1 Penicillin ae osol (see pag 153 f r te hnic) 50 000 100 000 units of crystalline penicillin G in 1 0 2 0 cc saline solut n q i d
2 Parenteral use of penicillin except during att ks of a te

A Mild to Mod t C es Pe icillin is the drug of hoice al though b o d spectrum antibiotics o ulfon mid s e almost q ally eff t e Eq l mixtures of ulfad a i e and sulf merazi or sulf oxazole (Gant i in®) re to be pr f red whenev ulfo amide drug ar dm n ste ed (ee pag 496)

1 P n llin
 a Do ge
  (1) Slow bs rption typ P icillin procain in aqu ous susp nsio o in oil 300 000 un ts I M d ily w ll usually uffic 300 000 un t b i d may b dvis ble in om as s
  (2) I t mitt nt I M pe icillin 15 000 to 20 000 unit qu ous pen illin very 3 4 hours
  (3) Intermitt nt I M p ni illin 100 000 units aqueous p n c llin very 8 hours
  (4) P n llin 200 000 units by mo th ery 4 hou is usually tisf tory b t g ne lly o l pen illin should b r v d for use aft r initial f orable r spon to pa nteral penicillin
 b D ation Co t n peni illin until pat t has been af b il fo t l sat 72 hour and whit blood ount norm l
2 B d sp t m ant b tics Contin until p t e t h s be af b le fo 48 72 ho s a d white bl od count is norm l
 Chl t t cyclin Hydrochlo d U S P (A omy ®) 0 25 Gm q 6 h
 b O yt t acy l Hydr hlo d U S P (Te mycin®) 0 5 Gm q 6 ho s
 c T t ycl U S P 0 25 Gm q 6 ho
 d Chloramphen l U S P (Chl omy t n®) 0 5 Gm q 6 h u s
 Erythr mycin U S P (Eryth o in®) 0 3 0 5 Gm q 6 h r
3 Sulf mid d gs
 a Dos g (G v 2 Gm od m bica bo te with a h Gm of s lf nam d)
  (1) S lf dia in U S P 4 0 5 0 Gm (60 75 g) at ce ally nd 1 0 Gm (15 g) very 4 hou
  (2) S lfadia n and Sulfam azin U S P 2 0 2 5 Gm (30 37½ gr) of e h o ally a d 0 5 Gm (7½ g) of each ev y 4 ho s
  (3) S lfi xazol U S P (Ga t isin®) 4 5 Gm (60 75 g) or lly at on e and 1 Gm (15 gr) very 4 hou
 b D tion C ti u therapy until p tient h s be af b il for 48 72 h rs a d wh te blood ount is n rm l

B M de t to S C e Pen illi to be p efer d b t b o d pe t m a tib t o ulf am de may be us d p t ents sit to pe icill
1 Pe illin In se g ve i t m tt t I M qu o s pe ill n i d e of 100 000 un t very 3 ho day and ight or l m llion units of p nic llin pr c i I M very 12 h r Co tin peni illi the py until p t t has been af b l fo 72 h s a d whit blood co t is no mal
2 B ad pe t m t bi ti s On f the tetr yclin 0 5 Gm very 6 ho

(esp cially recurrent hemorrhage) from predominantly uni lateral dis a e and who are otherwise good surgical r sks

DISEASES OF THE LUNGS

PNEUMONIAS

Pneumonia consists of inflammatory changes of th parenchyma of th lung almost always assoc at d with or due to infect on In the past it was customary to classify the pneumonias into anatomic l types (l lobar and bronchial) b t this classification serv s l til us ful purpose at present In view of the ev r growing numbe of antimicrobial agents one should cl ssify the pneumonias o the basis of tiology and t eat with the appropriate agent

The pneum occi are still the most common c use of p eumonia In gen ral t may be stat d that the management of all the p u monias follows th same principles as thos gov ning the manage ment of pneumoco cal pneumon a

PNEUMOCOCCIC PNEUMONIA (code No 260 101)

D g osis

A H t ry Usually sudden on et with chills and f v r Oft n pleuritic pain is present with cough

B Phy cal Finding Vary with ext nt l at on and d rati n of th p th log al p ocess from non o a f w fin r l to ma ive olid ti n of one o mo e l b

C L b ato y

1 Sputum Purul nt su lly ting d with bl od (l ght pink to the color of prune j ice)

2 All pati nts with pne mon (specially if severe) should h v th follow ng l b ratory xamin tions in ddition to routine u e and blood stud s ch t x ay sputum smear and bl od ulture

Tre tm t

Befo b g nning th apy it advi ble to obtain sputum and bl d for ult re in o d r to det min the x ct ba t rial invade This is imp rativ t the inf cti n s s r

Therapy varies with the severity of the disease de termine the severity according to the criteria shown in the chart on page 125 a d treat as outlined below

Sp cif M asu s

Pe cillin is the drug of cho n pneum coccal inf t s Chl rtetracyclin oxytetracycli e tetra y lin hlo mph n col and erythromycin ar also highly eff t v in most p umococc l inf ct on but are pr bably slightly inf rior to penicillin n v e infe tio s Th sulfo amide drugs are also ffect ve but th re sp nse to penicillin is s ally mo rap d and ompl tion ar less freq ent

Therapy Based Upon Evaluation of Factors Influencing Prognosis

Fact	Mild or Mode te	Sev	Very Sever
Age	U d 40	Ov r 40	
Organism count in sputum/oil field	Und 30	30 75	Ov r 75
Lob in ol ed	Singl	2 o 3	4 o 5
P l e at	Unde 120	Ov 120	Ov 140
Blood pre ure			
Syst li	Over 90	U d r 90	Shock o
Di stol	Over 60	Und r 60	pulmonary dema
Leuk yte count	Ove 10 000	5 000 10 000	Und r 6 000
Alb min i	0 to ++	+++ to ++++	
Ass t d d s a e	0 to m ld	Moder t	S e
Compl t ons	Non or st il ffus on	Empyem lung abac s et	M ningitis end arditis
Bl od cultu	N gativ	Po t' e	
Pneum co typ	H gh typ	I II III IV VII	
Mortal ty te			
Ra g	0 1 07	2 5 107	10 50%
Ave ag	0 4%	47	20%
Th py indicat d	U l dos of p ni illin b d pectrum antib oti or sulfo am des	H gh d of pe i illin b oad pe trum ant biot c o s lfonamid	Mas d ses f p n illin

(Modif d f om Mo is F Collen Pe man nte Found tion Med: l B ll tin VI 31 J nuary 1948)

may be dmin te ed in sev ral way Th soft rubber fa ial m k of the BLB OEM o B nn tt type is p bably best With thes mask xygen nc trat ons up to 95% m y b eas ily f ni hed Oxygen tent a g n rally us d f patient in t xic d lirium who would oth rwi e r move th mask How ev the tent is g r lly t advis d be us the av ag on ntration of oxygen i o ly about 40 50% and unl s watch d carefully arb dioxide m y a umulat

B Fl d. Fluid intak must b d q at wheth r g v n or lly or pa e t ally to maint in a urine outp t of at lea t 1500 cc P t ents taking ulfonamid should h v uff cient alkalini ing powder s that the u in is above pH 7 at ll times Pot s s um bica bonate sho ld b u ed in p tient w th a tual or pot tial heart failure b ing e c d to av id potas ium toxi ity

C Diet. During th e ve acute ph e p t ts us ally hav little d sir for food Du ing thi sh t acute phase food intak is f l ttl importan P ti nt who d v lop ompli tions and ha e long onvales c should be pl ced o high p ot in high vitamin high c lo ie d et

Symptom ti and Supp rti M a u

A To Del i m Th t ment and a tivity f th t xi d lirium whi h m y occur in ev pn umoni mu t be ont oll d

3 Sulfonamides
  a Sulfadi zine Sodium Injection U S P or Sulfamerazine Sodium Injection U S P 5 0 Gm (75 gr) or sulfadia zine and sulfamerazine 2 5 Gm (37½ gr) of e ch, in 500 cc (1 pt) M/6 sodium lactate I V as soon as diag nosis is made
  b *At the same time give* 4 5 Gm (60 75 gr) sulfadiazine sulfamerazine mixture or sulfiso azole (Gantrisin®) orally
  c Continue with 3 4 Gm (45 60 gr) sulfadiazine sulfam r *azine mixture or sulfisoxazole (Gantrisin®) every 4* 6 hours together with 1 2 Gm (15 30 gr) sodium bicarbonate with each Gm *of sulfonamide* If patient is unable to take oral medication he may be maintained on 5 Gm (75 gr) sodium sulfadiazine or sod um sulfamerazine or mixture of the two in 500 c M/6 sodium lactate I V every 6 hours watching the electrolyte balance If alk losis develops give the sodium sulfadiazine or sodium sulfamerazine in s line Do NOT administer sulfon amides in glucose blood plasma or amino acid solutions

C V ry Sev re Ca es Patients with v ry s vere pn umonias should receive m ssive penicillin th rapy in an attempt to achieve a pneumococc dal concentration of penicillin in infect d areas as rapidly as possible Combinations of penicillin and broad spectrum antibiotics or sulfonamid s off r no advantag s o er *penicillin alone*
  1 Penicillin 1 million units of aqueous penicillin I M every *2 hours or continuo s administration of peni illin soluti n* of 10 12 million un ts daily by I V or I M drip until favor able clinical r sponse oc urs
  2 Chlortetracycline oxytet acycline or tet acyclin 0 5 Gm I V every 12 hours or chloramph nicol or erythromycin 0 5 Gm every 6 hours until favorabl sponse oc rs
  3 Sulfonamides As for severe fo m Give 5 0 Gm (75 gr) odium sulfadiazine or sodium sulfamerazin o of a mix ture of the two I V at on e and follow with oral or I V ma nt nance as indicat d Alw ys maintain adequate alk linization and fluid intake

Ev luation of Therapy

If th re is no r sponse to therapy in 24 to 36 hours completely re examine cases for c us

A Incorre t Di gnosis Infecti n may be caused by microorganism resi tant to ant microbial agent used Where tiology of pneu monia is in doubt broad spectrum antibiot cs are u ually prefer ble to penicillin

B Spr ad of Pneumoni Treat as for ery sev r if not alre dy doing so Subst tute *o e of the tetracycline o chlor mphenicol for therapy alr ady under way*

C Development of Complications I *empyema lung abs ess* endocarditi meningit s

D Pres nce of an as ociat d di ease that may gi e fever

Ge ral M sures

A Oxyg n is very important in any patie t with s ve e or mod r ately severe pneumonia cyanosis or mar p e and

from the intestines

2 Neostigmin M thylsulf te U S P (1 2000 Sol) 1 cc (15 m) subcut and ins rtion of a tal tube will gen lly produ e rapid inuti l d omp ess on
3 Stom h tube f dilat t on of th tom ch Suction thr ugh a nasal tube p ssed into the stomach is n cessary

F C d ac Abno mal ties

1 Co g st ve f ilure In eld ly p ti ts or p tient with pr xisting heart di ase onge tive failure may be p ecip tat d by the p umoni When this occur digitali ati n by on f the rap d methods is i di ted (e p ge 197) This mu t b d tinguished f m sh k a d pulmonary edem (s e pag 126)
2 Ca dia arrhythmias The o urr nce f extr systoles is ommon and ge erally requires no t atm nt If uricular fib ill tion flutter d velop rapid failur m y be p ip t ted D gitalizat on by on of the apid methods i g n r ally ind ted in the e ca es (e page 197)

Compli ti s

For t eatm nt of these complications e the r p ct v d ases (Modified after Collen)

Complic tion	% In id e
St ile pleur l eff ion	4 5
Empy ma	0 3
Lung ab ess	0 3
P r arditis	0 3
Endocard tis	0 1
Mening tis	0 1

All pleural effu ion as ociat d with p umonias mu t be a p r t d p omptly t d t t ly mpy m which may be t ated m d lly (ee page 141)

STREPTOCOCCIC PNEUMONIA

(Lobar code No 360 102) (Bronchopneumonia code No 361 102)

An uncommon type of pneumon a, usually secondary to a pr ding pulmonary inf tion (i e viru pn umoni infl nz o m sles) Onset is most fte grad al but i at times udd n with s ver intoxication m ked dyspnea and cough with bloody or mucopurulent putum Pl ural effusion occurs e ly i fairly ommon and m y p ogr s to empy ma Most cas ar due to β hem lyti str pt oc i

Phy ic l finding vary with s v rity the may be only s t t d dulln s and moist al s In eve c s pl ural effus on obs ur p lmona y igns Thro t is usually redden d and has om xudate

T tme t

P nicillin is the drug f choic Do g i similar t that for pneumococ l pn umonia

to save the patient from exha t on or circulatory failure

1 Paraldehyde is the drug of cho ce for this purpose
   a Oral 8 cc (2 dr) at once if th re is no respo s in 30 minutes repeat dose until patient is quiet Then give 4 15 cc (1 4 dr) every 3 4 hours p r n restl sness
   b Intramuscular If pat ent s un ble to swallow giv 4 cc (1 dr) at once if there is no respons in 30 minutes re peat dose until patient is quiet then give 4 8 c (1 dr) I M every 3 4 hours p r n restle s ess
2 Barbiturates M ld restlessness and sleeplessn ss can be treat d with the following drugs
   a P ntobarbital sodium (p ntobarb tone sodium) 0 1 Gm ($1\frac{1}{2}$ gr) at bedtime
   b Phenobarbital (phenobarbito e) 15 30 mg ($\frac{1}{4}$ $\frac{1}{2}$ g) t i d during the day

B <u>Sho k and Pulmonary Ed ma</u> The usual us of de th in pne monia is shock (e c rculatory collapse) and/or pulmonary d ma The most important facto in managem nt of these conditions is v y e rly recognition and prompt vigor s tre t me t Ther py is eas t lly th sam n both co d t ons

1 Treatme t f *SHOCK* s e page 27
2 Treatment of a xi Beca se of the important role of anoxi in the p od iction of sho k and pulmon y dema in p umon a prompt initiat on of o ygen th apy p ef rably w th p s tive pressure fac al mask is of tm st imp rtan

C <u>Cough</u> Generally requires l ttle th rapy and clea p ap dly w th ad quate tr atme t Exp ctorants a e of little val e if ough s s v r Cod ine m y g v r l f and h lp pat nt to l p

1 Cod n pho ph te 0 03 0 06 Gm ($\frac{1}{2}$ 1 g) o ally or ub utan ou ly ev y 3 4 h u
2 ℞ Ephedrine sulf t

or hyd ochlor d (1% Sol)	30 0	℥i
Codeine phosphate	0 5	gr vi ss
Syrup of wild ch ry or othe vehi l q d	120 0	℥ v

Sig 4 (1 t p) q 3 4 hou p r n cough

D <u>Pleuriti Pa</u>

1 Mild pain Ethyl chlor d p y for cutaneous anesth sia Spray f about 1 m nute ov a a of g at t pa n and v r t cally over enti a of pain so that a line of f o t abo t 1 ch w de is f m d Th *method gives* elief f m p n fo 1 to *10 hou* in gr at m j *ty of p ti nt*
2 Severe pain *Procain* hyd ochloride *infiltr tion* ($\frac{1}{2}$ 1% *Sol*) *is injected subcut in a vertical lin* p ng through the area of gre test p in nd 5 m *high r and low r*
3 V *ry sever* p *in* Meper di Hydrochlo d U S P P thidine Hydrochl ide B P (D merol®) 50 100 mg *appears to be drug of ch* for t has l ast d p e i g f *fect on the* respir tory a d cough fl es

E <u>Abdominal Di te t on</u> Abdomin l d stention g n lly d t air swallowing as oc ted with eve dy pn a is f equent in pat ents with pneumon a

1 Oxygen therapy in high concent ation (90 100%) i usually most useful b cause the oxyge is v y r p dly ab o bed

from th int stin

2 N o tigmine Methyl ulfate U S P (1 2000 Sol) 1 c (15 m) ubcut and in rt n of a rectal tube will g nerally produc ap d init al decompre sion
3 Stomach tub for dil tation of the stoma h S tion through a nas l tube pa ed into th tomach is nec sary

F C rd c Ab orm lit

1 Cong st ve f tur In elderly pati nts or pati nts with p e ex sting heart dis ase congestive failur may be pr ipitated by th pn umoni When this occu s digitalizat on by one of th pid method is ndic ted (s e pag 197) Th s must be distinguish d from shock and pulmonary dema (se p g I 6)
2 Ca diac a rhythmias The oc ur n e of extrasystol s is common and gen ally requires no tre tm t If auricular f b illation or flutter d velops rapid failure may be pr p itat d Digit lization by on f th r p d methods i gene ally ind cated in th se a es (ee p ge 197)

Complic tions

F t eatm nt of the e compl ations see the r pect ve di eases (Modifi d aft r Coll n)

Compli t on	% Incid n e
St ril pl ural ffus on	4 5
Empyem	0 3
Lung abs ess	0 3
Per arditis	0 3
E doc d t	0 1
M ning ti	0 1

All pl ural effusions as ociated with pn umonias mu t b s p ted promptly to d t t ly empyema wh h may be tr ted m d ally (e page 141)

STREPTOCOCCIC PNEUMONIA
(Lobar code No 360 102) (Bronchopneumonia, code No 361 102)

An un ommon typ of pneum nia usu lly secondary to a p ceding pulmonary infe t on (i e virus pn umoni influenz or m asl s) Onset s mo t often gr dual but is t times udd n with sev re intoxi at on m rked dysp a and ough with bloody or mu opurul nt sputum Pleu al effusion occurs e rly i fairly c mmon and m y progr to empyema Most case ar due to β h molytic str ptococci

Physic l findings v ry with s verity ther may be only at t ed dullnes and moist l In eve e ca s pleural effusion obs ures pulmonary igns Thro t is usually r ddened and ha s m exudat

T tm t

Peni illin is th drug f choic Dos ge i similar to th t f r p eumococcal pneumonia

STAPHYLOCOCCAL PNEUMONIA (code No 381 105)

An uncommon type of pneumonia usually secondary to preced ng infection The onset is usually g adual and progressive to grav ill ness Cough and dyspnea are common Multiple lung abscesses occur frequently Patchy consolidation with diffuse rales are oft n found Sputum is variable in appearance

Treatm nt

Sensitivity tests should be performed Pending the res lts of the *tests th following should be gi en I M ev ry 6 hours Erythromycin U S P (Erythrocin®) 0 5 Gm Novobiocin N N D* (Cathomycin® Albamycin®) 0 5 Gm *Chloramph nicol U S P* (Chloromycetin®) 0 5 Gm Bacitracin U S P 20 000 units

FRIEDLANDER S PNEUMONIA (code No 381 131)

Pneumonia due to Klebsiella pneumoniae is oft n associat d *with chronic debilitating diseases The ons t is usually sudden w th* chills *fever dyspnea cyanosis cough and marked* toxicity and in most cases progresses rapidly to a fatal termination Ther is a tendency to necrosis and ab cess formation in the subacute or chronic forms Early recognit on is imperati e f r favorable out come

Physical findings are variable and ext nsive nvol ement m y give only dullness and *d minish d b eath sounds Sputum is r ddish mucoid and tenacious giving a cu rant jelly appearanc Wh te* blood cell *count is variabl* may have leukopenia or l ukocytosis

Tr tm nt

A Specific Measur s Tr t all Friedlander s pneum n s s very severe infections

1 *Streptomycin 1 Gm eve y 6 hours until favo able respon e o urs then 0 5 Gm every 6 h urs until afeb ile 3 days*

and 2 *One of the tetra yclines (I M or I V) or* hl ramphen ol 0 5 Gm ve y 6 hours *o* Gantris n® 1 Gm every 6 hours Continue for 2 3 we ks

B Gen ral M a u e See Pn umo o ci Pneumonia p ge 124

HEMOPHILUS INFLUENZAE PNEUMONIA (code No 381 110)

A rar form of pneumon a whi h usu lly is rap d n ons t and prog ession The outstanding features are sever in ol ment f the bronchi and bronchioles l ading to bronchiect is nd hemor rh gic edema of lungs *Patients are extremely toxic*

There is a p tchy con *olidati n and the sput m is bloody Leukopenia is frequently present*

Tr atment

A Specif c Me sures Continue tr atment f 7 10 days fter t mper tu e h returned to normal

1 Combined strept my in *and sulfon mid th rapy i th tr t* ment of cho ce *Streptomyci 0 5 1 Gm eve y 6 hour I M*

and lf nam d s f v ry s v e pn m o al p eu mon (p ge 124)
2 Combin d t t cy lin s (I M o I V) o chl mphe ol 0 5 Gm v y 6 hou s plu s lfonamid as fo ever p mo cal p um ni s

B Ge e l M S P e moc i P mo ia p ge 124

PRIMARY ATYPICAL (VIRUS) PNEUMONIA (code No 360 160)

Viru pn umo ia m t ommo ly has a g du l ons t with chill n s mild f v non prod cti e cough mala s nd h ada h The p t ent usually doe not app ar too ill and for thi reason the d s as in most c s i not r cognized

The phys l findings e variable may b ab ent or how small reas of r pitant ral nd oc onal dulin s Th fevef rea h s pe k in 2 3 d ys and f lls by lysi for th n xt 10 day In ever ca fev r may last for we ks

Roentg n xamin tion f chest r ve ls patchy onsolid t on Th l b ratory f ding are usu lly w thin n m l l mits Cold gglutin t on test p s tive in abo t 50% f ses thr e w ks aft et

T eatm t

A Sp f M u es Give o f the t t y lines 0 25 0 5 Gm e y 6 h u s o ally I V the apy may b ces ry in ev re es or f p tie t is v miti g may b comb ned w th o al the py es tant G ve 0 5 Gm ery 12 ho s

B G l M S P e mo occ Pne mon a p g 124

PULMONARY TUBERCULOSIS (code No 360 123)

Diagno i

On of the prin ipal p obl m in th d gnosis f tub culo i th finding f early ases b fore ymptoms are pr a nt The o ly way to d s er e ly cás is by p riod x ray xamin tions f the hest Whe the cha acter sti sympt ms of ough weight l ss and n ght sw at ppe r the l on s n lo g ly Th e a ertain step that m t be follow d in making a diagnos of a tiv p lmonary tube culos s

A D m nst tion f a Pulmon y Les on Alw ys check pos tive x y t amin t any po bl e N v assu e a p t nt he d e not h pulmon ry t bercul is without n ay x mination of th che t

B P oof Th t L ion Tub lou

1 Skin te t The int ad mal method i the most liabl B gin with 1 10 000 O T if this i n gat v giv 1 1000 if this i neg tiv u 1 100 In sing PPD t rt w th 1st st e gth if thi is egativ us 2 d t gth The t t is r ad in 48 72 hours and t least 5 mm indu t on (w th o with t ednes) is requi d f a pos t ve t t

With few exceptions a negative reaction to tuberculin in the dilution of 1 100 0 m or seco d strength PPD excludes tuberculosis

2. Recovery of tubercle bacilli This is the only certain method of establishing the diagnosis However this may occasionally be difficult and it may be ne essary to institute treatment on the basis of a strong presumptive diagnosis (i e a typical x ray lesion in a young p rson with a positive skin test who has been in contact with an active case) In the absence of sputum a gastric or bronchial lavage may be necessary Bronchial lavage is done by spraying the pharynx and hypopharynx several times with 1% Pontocaine® The patient shou d be fasting in order to avoid asp ration if emesis occurs With the aid of a laryngeal mirror 5 10 c normal saline is injected b tween the vocal cords via a curved cannula The pati nt coughs this out into a sterile container Inject on of saline may have to be repeated several times to get an adequate spe imen (approximately 15 cc) The spec men may be examined for tumor cells as well as for tubercle bacilli The patient m st not take anything by mouth fo two hours after the procedure

   Non pathogenic acid fast bacilli may occasionally ca se confus on especially in smears of gastric contents Guinea pig inoculation will dif erentiate these from tuber le bacilli When tuberc) bacilli cannot be recove ed other diagnostic poss biliti s must be conside ed

C. A tivity of a Tuberculous Lesion Once tuberculosis has been diagnosed the status of the l on must be determined to decide if therapy is needed

1. Presence of tubercle bacilli in the sputum is evidence of activity
   Eith r progression or regr ssion of the les on by x ray espe ially within short per ods of t me ind cates activity
3. A cavity s us ally evid nc f a tiv ty
4. Oth r manifestations suggesting a tivity
   - a Afternoon f ver
   - b N ght swe ts
   - c Blood streaked sputum
   - d Weight loss and/or fatigability
   - e Pleurisy with or w thout effusion
   - f In reased blood sedimentation rate
5. Any newly d scovered tubercul us lesion should be considered poss bly a t ve If this cannot be immediat ly determined sputum studies should be continu d together with close observation by monthly x rays for 2 3 months If no change occurs and ultu s for tuber le bacilli remain negative the inte val between f lms can be lengthened but ob se vation should be continued for at least 2 years

Treatment

A. Rest Bed rest and mental relaxation in ch rful comfortable surroundings either at home or in a sanatorium should be instituted whenever an act ve lesion xists or is probabl This is still an important measure in the therapy of pulm ary tube culosis although the durat on of the rest period req ired h s been reduced by the antituberculosis drugs Bathroom privi l ges may be permitted where symptoms are minimal or abs nt

1 Advantages of s nato ium care Mo t a thor t pr fer sanatorium ca to h me treatment Th r re s veral advant g s to inst tut o al manag ment

W ll co troll d and symp th t c envi onm t whe e the chi f occupation i th ca e of t berculous patients

b Educat a d instr ction i the c e of t berculosis by m ans of a well o gan z d pr g am

c Cont t w th other pe sons who ha e the s m dis a e a d im la p oblems Observation of the s cess of a well controll d program of est

d C mplete b eak with old en ronment a sur more com plet mental nd physical rest

e Medical obs vat on mor f eque t nd ontrol of man g me t mo e complete

f Pla ned pr g am of gr d al incre s of acti ity and ecreation u der well trained pe onn l

g A tive therapy (i e d ug ollaps surgical etc) mo e sily be admin t ed

h I olation pr utio c n mor e ily be enf ced thu p eve ti g the p ead f th disea e

2 Adv ntages of home a e Home are i somet m s d ir bl but fety of oth f mily m mb s undist rbed re t period adminst atio f medi ine et mu t b p o vid d for Advantag s and indicatio

a L s f cial bu d n to a p ivat pati t

b For p tient unable to adjust to institut o l ca e A t o bled h me it at c n om times be stabiliz d by th mer p es n of the pati t

B Dr g Th py Th has becom th most mpo tant me s re in t be ulo tr tme t It i i dic t d in all ca s of act e dis ase a d is mo t ffective when d njunct on w th a well regul ted progr m of b d est as w ll as oll ps the apy a d urg ry whe dicated (ee b low) In ge er l the ret rn t limited physi al a ti ity is p rmitt d o ner with d ug the apy nd gradual ambulation m y b ta ted a soon a clinical imp ov ment i w ll establ hed

Dur tio of dr g therapy in pulm nary t be culos s Th p e nt r ommendatio is f pr longed admini tratio of c mbin tion of the d gs li t d bel w (c pt viomycin a d py a i amide) Ma y pati nt s m to be efit f om pr longed tr atm t en after mod ate re i tan e of th o ganism to the d ugs has been shown by s n itivity t sts Mo t autho ties ad is a minim m of 12 months of dr g t atm t after the ina ti stat s (N tio al Tubercul si Assoc ation 1955) h s be attai d It sh ld be empha i d ag in that d ug t e t m t h s n t y t b en shown to be a sub tit t f rest and coll pse the apy

The p in pal drugs now u d i th t eatm t of pulm ary tube ulo is a e i oniaz d (INH) tr ptomyci or dihyd st p tomy in and am o l yli acid (PAS) Th simulta eous use of th s th drugs is probably j stifiable f g avely ill pat ts but in the mo chroni fo ms of pulm ary tub cu l i no definit advant g has b e shown I g ne al it is probably wi e to w thhold i o iazid or str ptomycin p ferably th latt f r p s ble lat r u (g with g ry)

1 Isoniazid U S P (INH) (See page 133 for dosage) This is the most effective drug c r ently available Howe er when used alo e its effectiveness is decreased by the arly development of bacterial resistanc It should be used with at least one of th other drugs mentioned below

a Indications Any active t b c l s lesion i cludı g pri mary tuberculo s in children This drug has part cular val e in miliary tuberculosis tuberculo s meni gitis (see page 468) streptomycin resistant t b rc losis and str ptomycin intol ra ce

b Toxicity Toxic re ctions to isoniazid are infrequent in the usual dose of 5 mg /kg /d y They include dermatitis and f b ile reactions With larger doses per phe al neuropathy a d arely C N S irritability m y occ r There is good evid nce that the latt r are relat d to pyr do n depletion S ppl mentary doses f pyr do ne (25 50 mg /day) should be given

2 Streptomy Sulfate U S P and Dihydrost ptomycin Sulfate U S P (See page 133 for dosage)

a Indicat on The ind cations for these d gs are th sam as f n azid ex pt that th y a e less eff tive than isoniazid n adva ced tuberculosis L k iso azid they are less effective wh n sed alo e and wh ever po sibl should be g v n n c mb ation w th at l st on of the *othe drugs*

b Toxicity Str ptomyc n nd dihyd o t eptomyci ar e ent ally like in the apeutic effect Since the t xi ity of d hyd o treptomycin for the ghth nerve (d af ess) s mo o th n th t of streptomy n (vert g) th lat t r mo e commonly used Exper n e ha hown that d v ding the usual do e into eq al parts of st ptomyci and dihydrost ept my in red ces th toxicity of both d gs

Toxic reactio s to these dr gs a f w when g ven twi weekly There is ample ev d n that th g men p odu e a therape tic effect omparabl to othe st pt my n hedul s (xcept in th mor s r o s fo ms of th di a e where da ly dos ge may be n s ary) G neral i ed d matitis occas o ally u n whi h ca e the d g m t be topped Per oral n mbn ss often ppe rs sho tly afte i je ti n a d may last for several ho s By itself it c n be gno d

3 Ami osal yl Acid U S P (para aminosalicylic ac d PAS) (S page 133 f d ag)

a Indicat ons This drug has a low l v l of nt t b t s s a t vity but wh n s d w th st eptomycin or is a d it d lay the em rg of ta t o gan m

b To ty Toxi reaction to PAS includ a s a vomit ing and d arrh a a feb ile r a t a d o i ally g nerali ed de m t t s The gastr intestinal symptom may somet me be overcome by g a d ff r t p para t on or by topping the d g fo eve l d ys and then ming it in small do e grad ally incr as ng to the regular do in 2 3 we ks Whe f nd/o d matit s due to PAS occ rs th d g ually m t be topped

4 Viomyci Sulfate N N D (Vi actane® Vio in®) a l

eff t ve and m e toxi d g ha limit d usefulness wher hemoth rapy i n ded a d the abo ment o ed drugs ca ot be us d The al dos 2 Gm I M d ily o twi w ekly fo up to 6 weeks

5 Py in m de (py a noic ac d amid PZA) a drug which oc lo lly p od eve toxic h patit s n b u ed lon o with i i z d fo p r ds of 1 3 mo th when t n hyper ensit vity to th other drugs i p esent C ref l b ervat o for symptoms a d labor tory evidenc of l dysfun tion m st be l d out and th d g t pp d promptly if any bnorm lity appe rs The u al ad lt d e is 0 75 Gm twi e daily

6 Cyclos ri e N N D (S omyc ®) The pl ce of this d g the tr tment of tuberc lo is ha not yet been d te m ed

ANTI TUBERCULOSIS DRUGS

DRUG	ADULT DOSE		REMARKS
St ptomy in o D hydrost pto my	1 Gm daily o 1 Gm 2 times p r we k		Only ind t on f r sing thes d gs ingly is hyp se i
Am o alicyl Ac d (PAS)†	4 5 Gm t i d p c		t v ty of th pati t or kr wn s ta e
Iso az d (INH)	5 10 mg per Kg p d y§		of b c ll to oth r d ugs
Combin d The apy	Co ti o s	Inte m tt t	Any tw of these
St ptomycin	1 Gm p day	1 Gm tw e w kly	th e d g may be us d (x pt in v e d ase whe e alt th e a e ind
d			at d) U INH
Ami l cyl c Acid	4 Gm t d p (w th ith of abo e s h d le)		wh r poss bl I v d s s s d ily t pt my in
a d			(t l imp ov m t is tabl h d th
I a d	5 10 mg p Kg pe d y§ (w th th f abo sched l s)		tw e w kly) and 10 mg per Kg per d y f INH

Equal p rt of t eptomy in dihydr str ptomy n (e g 0 5 Gm f a h) a e l s t xic th ith dr g al e

†F m ly par min al cyl cid M y u calc m or sodi m s lt in me do g

§In d vid d do

C Collapse Th rapy Collapse therapy is often of benefit in the treatment of recent lesions (especially where cavitation is present) permitting earlier ambulation Pneumoperito e m is the principle method now used having largely replaced pneumothorax because of the high incidence of i reversibl pleural complications in th latter Once instit ted treatment should contin e for 3 4 years for maximum effecti eness

D Surg ry

1 Pulmonary resection This has gained increasing p p larity in the treatment of pulmonary t berculosis in recent years although only about 10 15% of patients now bei g tre ted in tuberculosis hospitals require major surgery Th following indications are widely accepted
   a Localized nodule especially where diagnosis i in doubt
   b Bronchiectasis causing positive sputum
   c Bronchostenosis
   d Thoracoplasty failure (Some of these can be success fully treated by esection)
   e Any localized chronic focus which has not become in acti e (National Tuberculosis Association 1955) after 9 12 months of adequate nonsurgical therapy

2 Thoracoplasty The current ind cations are decreasing in number and are as follows
   a Chronic avitary lesions where resection is not feasible and where the lesser p ocedure can be tolerated
   b Certain cas s where later resection is contempl ted and it is felt that thoracoplasty will improve the patie t s g neral cond tion
   c To r d ce th pleural dead pa e after a large pulmonary resection and thus minimize o er distention of re mai ing lung tissue
   d To clo e chronic empyema spaces

E Di t A diet adequate in calories a d high in p ot ins and vita mins should be employed On should generally att mpt to keep th tuberc l at p tient s weight above normal No specific diets h ve be n shown to be of benef t If the patient is not eating and is lo i g we ght forced f edings by tube if neces sary should be institut d

F Cl mate Th re i littl e idence that limate plays an impor tant part in the management of tube culo is In the past heliotherapy or ultraviolet irr diation was widely ecomm nded There is no evid nce that this the apy is of any val e and it may be harmful in pulmonary t berculosis A oid sunburn or direct sunlight to the chest

G Symptomatic Treatm nt Pati nt should be reas u ed that his symptoms will dis pp ar as the illn s i b ought under contr l

1 Cough In general cough in t be culosis ho ld not be suppressed by means of dr gs Th non p od ct ve cough serv s no useful purpose and c n gene ally be ontrolled voluntarily If cough is productive th pat ent should b encouraged and instructed to cough prope ly (i e witho t initial violent inspiratory phase the actual cough likewise should be without effort) It may become nece s ry at times to use medication to suppre s a cough when it i e hau ti g to the patient In th se cas s codeine 8 15 mg (1/8 to 1/4

g) or lly may be helpf l Banyai has fo d that int mit t t inhal tio f 5 10% carb n dioxide with o ygen ca ses a d minution of the co gh Ca es w th la ge cavitie nd cop ous sput m may b helped by po tural d ainage

2 Night sweat Effo ts t cont l th should be di cted at a oid g exc iv nd unnec ry bed clothing Atr pi e lf te 0 4 0 6 mg (1/150 1/100 gr) ally may be t ied at b dtim but i g n ally of l ttle val e

3 Hemor hage The chief da ge f om h morrhage tub culos is not s dden de th b t asp rati of the inf ted bl od a d sp e d of th disea e to other p rts f the lung Th efo e do not u e c gh inhibit s in the tre tm nt of hem rhage *morphine sulfate should be avoided*

Sh k the apy hould b i stit ted if bleed g i sev e and shock is imm n nt (see pag 27)

b R ass an is most import t i allaying appr he sio

c Phenob rbital sod um 60 120 mg (1 2 g) s bc t may be of val e in q iet g th appr hens e patient

d Collap the apy At tim if s vere bl ding onti ues ollap e th py may b com an m rgen y m a ur b t th s in l es the da ger of cau ing pr ad of the disea e Whe e e bleed g co ti ues Po terio Pituitary In j tio U S P 1 cc (10 I U) in 10 cc orm l salin can be given SLOWLY I V (1 cc /min) Bleeding s me tim stop promptly

f N nsp if c mea res Ab ol t bed rest is e ential The v l e of pos tion g is ont ov sial but c mplet mmobilizati n unwi e Mo ing f om tim to tim h lp b i g up e et ns Instr t patient in pr per m thod of c ghi g (ee abov)

P ophyla is

A I l ti P a tio All nece ry p eca tio m t be taken wh n se i found o s pe ted

B BCG Imm i at Although ext s v st d es e till i p ogr the val e of cti e mmuni tion of the ge e al pop ulati n with BCG v ci e r m i do btful afte many y a s U til the r lt a e va labl ro ti immunizati ns ho ld not be considered exc pt fo ind vid al w th gat ve t b c l n t ts in wh m the ri k of i f tio is g eat (i e m d l st dent n es etc)

C T atment of R e t T be c lin Co rto Mo t a thor ties ow ec mm d the t e tment of c rt in ind vid al kn wn to have b en e tly (within the p ced g 6 month) infected by t b lo is ven th gh n e iden e of the di ea oth tha a p sitiv tub r ulin rea t o is p ent Child en up t ag 3 should routin ly re eiv a o r e of d g t eatme t (s e b low) when v a positiv tub ulin e ti is fo d ic it is in this group that the mo t ri s mplicatio of tub r losis e mo t likely to oc ur Some ad o at th tr atm t of ce t t b culin on rt rs f a y age

Thi p e ti tr atm nt o sist of a u of dr g th apy with t oth r r t t tio Isoni zid 5 mg /Kg /d y should b d tog ther with min ali yli a id (PAS) 200 mg /Kg /day f 8 12 mo ths Whe e PAS is n t tol t d st ept my in 20 mg /Kg twi e weekly m y be bstit t d

LUNG ABSCESS (code No 360 100 2)

The etiology of lung abscess should be determined in all cases before therapy is instituted because the underlying process may be as important as the abscess and may modify the course and treat ment About 25% of the cases follow oropharyngeal surgery Causes of the remaind r include pneumonia aspiration of fore gn body bronchogenic carcinoma or other bronchial obstruction bronchiectasis and emboli

Diagnosis

A History

1 Acute lung abscess Usually follows oropharyngeal surgery pneumonia or other systemi or local infections Th re may be a latent period especially post surgical followed by rapid development of cough malaise chills and fev r and pleurisy with or without effusion Pat ent bec m s very toxic and breath becomes foul Several days later patient may suddenly ough up a large amount of pus and at this stag the diagnosis is certain

2 Chronic abscess The manifestations vary with extent and location of the ab cess There is ge erally low grade fever cough with copious sputum pleurisy and weight loss Chronic lung abscess usually occurs secondary to bron hi ectasis or b onchial obstruction

B Physical Examination Findings vary with the size posit on contents of the cavity and local pulmonary reaction

C Laboratory Findings

1 H m tolog cal x mination usually typical of severe infection

2 Chest x ray m y show cavit tion with a fluid level and sur rounding pneumonitis

D Bronchoscopy This is an important diagnostic procedure in s much a an obstructive lesion or foreign body in the bronchus m y be found

Treatment

A Sp cific Meas res

1 A ute absces Begin antibacte ial agents early to prevent destruction of lung tissue Make smear and culture of spu tum to determine p edominant organism and employ the appropriate antibacterial ag nt o agents in very high dos ages (see table on page 514) If patient fails to r spond surgery i indicated without d lay

2 Chronic ases Although some few chronic cases will get well on a medical regimen as outlin d above for acute ab scess therapy with antibiot c agents is used to decr ase infe tion in preparat on for surgery

B General Me sures

1 Supportive and symptomatic care

2 Postural dr inage is v ry important to preve t ac umulation of material (see page 121)

3 Do n t depress the cough reflex by use of sedative cough medicine

4 Bronchoscopy is usually indicated to promote d ain ge

C Follow up The pat ent cannot be consider d cured until there

h s b n compl t l ing of the lung by x r y Serial x ys requ ed in this foll w up which may tak many weeks

NEOPLASMS OF THE LUNGS
BRONCHOGENIC CARCINOMA (code No 350 8)
(Epidermoid code No 350 814)

N opla m of th lung form a v y important group of the m l gnanc e Th m t static tumo s a m t ommon but th p ima y eopl ms a of g e te t inter st in di gn is and therapy Th prim y u ually ar from the bronch and sp ead into the lung field Th y are rarely d gn ed e rly b caus of th insid ous o t and tend n y to mimi other pulmo ary d s Ch nic ough th omm n p esenting sympt m As th proc ss p ds th o gh becom pr du tive and h m pty on olid tio at lecta is lung abs s a d pleural effus on m y oc ur It must lway b id d in th di gnosis of any acut o h onic pul m ry d s e esp ially in m l s ov r 50 y s f g Bronchos opy and min tion of putum fo n er cells ar impo tant d ag n st c t ol

T eatment

A Surge y th t e tm nt f hoi e wh n th lesi n is discov red e rly

B S pport e a d symptom t m su s f tho ses in which urg y annot b p f med

PULMONARY ATELECTASIS
(Compression code No 362 435)
(Postoperative code No 362-415 4)

Atel t s s i due t ob truct on of b h s w th b o pti f the and coll p of th lung d t l t th ob t uction Mo t c e follow m j su g y and t d to ur in the r ght l wer l b The c ndit on u ually i manife t l 4 d y aft surg y and th finding r tho e of p ent lati n and oll pse of th inv lv d a ea If imm diat t tme t s not a ried out s ond y b ct i l inv i cu and a pn umon tis d v lop

T eatm t

A Po t p ti e At l t s

1 F p t t to hyp til t th vol t ly o by use of a mixtu f 95% O_2 and 5% CO_2 admin t d by m k f ev al minut s ev y 1 3 h s Th is al o g od p nti m u

2 B on hodil t t on by l w th inte mittent p iti pr su (g B nn tt valv) has b n d m t t d to l m y f po t p t t l cta i Th pp ratu hould b d fo 30 m t s e y 2 3 h r f 24 ho b f d di g that th me e c y

3 A pi ti of tl t h b h l t e with ft bb th t pa ed blindly th o gh the nas ph ynx o w th the id f a i yngos op i oft ff cti e

LUNG ABSCESS (code No 360 100 2)

The etiology of lung abscess should be determined in all cas s before therapy is instituted because the underlying process may be as important as the abscess and may modify the cours and treat m nt About 25% of the cases follow oropharyng al surgery Causes of the remainder include pn umonia aspiration of fore gn body bronchogenic carcinoma or other bronchial obstruction bronchiectasis and emboli

Diagnosis

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1 Acute lung abscess Usually follows oropharyngeal surgery pneumonia or other systemic or local infections There may be a latent period especially post surgic l followed by rapid development of cough malaise chills and f ver and pleurisy with or without effusion Pat ent becom s very toxic and breath becomes foul S v ral days l ter patient may suddenly cough up a large amount of pus and t this stag the diagnosi is certain

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B Physical Examination Findings vary with the size posit on cont nts of the cavity and local pulmonary reaction

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1 H m tolog cal examination usually typ cal of s ve e infection

2 Chest x ray may show cavitation with a fluid level and sur rounding pneumonitis

D Bronchoscopy This is an important di gnostic procedure inas much a an obstructive lesion or foreign body in the br nchu m y be found

Treatment

A Specific Measures

1 Acut ab es *Begin antibacterial ag nts arly to prevent* destruction of lung t ssue Make smear and culture of spu tum to d termine predominant organism and employ the app opriate antibacterial agent or ag nts in ve y high dos ages (see tabl on page 514) If patie t fails to respond surgery i indicated without d lay

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B General Measur s

1 Supportive and ymptomatic care

2 Postural drainag *is very important to preve t ac umulation of material* (see page 121)

3 *Do not depress the cough reflex by use of sedative cou h medicine*

4 Broncho copy is usu lly indic ted to promot drainag

C Follow up The patie t cannot be onsidered cured until th r

r p rato y idosis Although it s occas ally ben f cial t has the d dva tag of i cr ing total a id sis Th al dose is 250 mg (4 g) tw e d ly

PULMONARY INFARCTION
(Due to Thrombus code No 360 511)
(Due to Embolus code No 360 512)

Pulmon y fa ction du t an mbolus thrombus oc lud ing a br nch of th pulmona y art y A wedge sh ped a e of lung t s d t l to the oc l sion becom s inf ltr ted with blood which ext vasat into i c ll and pulmona y tissu

D g os

Th gns and symptoms va y w th the s of the blood ve sel occl d d If the infarct is m ll the m y be no manif stations If l g the m t common finding are h moptys ch t pain (su lly pl uritic) nd dy pnea If mo e ev th e may be r ght heart fa lur and death If p tie t urviv moderate or severe inf r t on dy pn a hest pain pleurisy with or without eff sion and f v r b ome promin nt Ecg evid n e f ight he rt str in m y be a very ly finding Leukocytosi and in ea ed sedim n tati n rat persi t until th infa tio has healed X ray of the ch st m y show w dge sh ped a ea of ons lidatio

T e tm t

Wh n v r patie t ha a pulmon y embolus su pect v nou th ombosis a id inst tute immediat the apy f r the thrombos s (s p ge 215)

A Em gency M as es
1 O yg n in high n ent ation pr f ably 100% (by m k) to o erc me a i This l o h lps pr vent cardio- esp r to y f il e
2 P p v ine 30 60 mg (1/2 1 gr) and at opin 1 2 mg (1/60 1/30 gr) I V slowly d repeat ry 3 4 hou Thi helps ov rcom the gen r l pulmonary arteriol r pasm that oc u s
3 Morphin ulf te 8 15 mg (1/8 1/4 g) or Mepe idine Hyd ochl r d U S P (D m rol®) 50 100 mg (3/4 1 1/2 g) subc t or I V to help ontrol pain
4 If sh ck p se t I V fluid hould be us d with great a ti n beca e of pos ibility of p pitating cut right h t f ilur
5 If acute right h rt f ilur d lops V nes ct on sh uld b perf m d (se p ge 185)

B Foll w p T tm t
1 Ob v ef lly fo e d ry inf ctio d in t tute antibiot t e tm t p mptly f g s oc ur
2 Tho a tesis If pl u al effusion oc u and emb rrasse respir tion mov by p t s

P ophylaxi

The p ophylaxis of pulmona y infar tion on i t of the tre t m t f ve ous th ombo is (s e p g 217)

4 If the above fail aspiration of m cus by bronchoscopy is indicated
5 Antibiotic therapy P o aine penicillin complex 300 000 units b i d

B <u>Spontaneous Atelectasis</u> Bronchoscopy to determine the nature *of the ob t uction* and then institute appropriate treatment

PULMONARY EMPHYSEMA
(Due to Unknown Cause code No 362 9x6)
(Postural code No 362-434)

P lmonary emphysema is a disease usually found in older in dividuals and those suffering from chron c bronchial asthma Th re is progressive distention of the pulmonary alveoli with subseque t rupture of the interalveolar membranes and replacement f th al eoli by la ger poo ly functioning air sacs

The diagnosis is generally not difficult Th chief complaint is dyspnea The anterior posterior diam ter of th chest is generally enlarged The lung fields are hyperres ant and breath sounds coarse Pulmonary emphysem must be differentiated from dysp nea due to congestive failure

<u>Treatment</u>

A <u>*Spec f c Measures*</u> Since many pat ents ha e an associated ch onic b onch tis with some elem nts of pasm th rapy is gen rally similar to that outlined for chronic b onchitis or chronic bronchial a thma (see page 116)
1 Spasmolytic agents to r lieve bron hial spasm Epinephrin by inh lat on ephedrine etc (se page 118)
2 Eradicate any infection Pe icillin or t eptomycin aerosols (e page 153)

B <u>G ner l Me re</u>
1 Inhalat n of 100% oxyg n t i d for 20 30 min te helps re lieve dy pnea and appears to r duce spa m R ce tly th use of int rmittent posit ve pr ssure in some c s s with bronchial dilators has been shown to be f co siderable value *Oxygen must be used with caution in cases with long-standing anoxia since use of 100% oxygen has caused coma and even death in some patients* (see page 144)
2 Maintain mechanical effi ncy of diaphragm at it optimum
   a Abdominal b lt Obe p tients o those with a poor ab dominal musculature hould wea an abdominal belt dur ing the day (e g Kerr Lag n b lt)
   b Manu l relief of overdistention of lungs The p lms of both hands are placed under th ant rior bs and pushed inwards and upwards during end of expi ation This is repeated 10 15 times 2 3 times daily Patients often claim their dyspnea is elieved fo hours by this m neuver
   c Therapeutic p e moperito um can be employed i s lect d patie ts to mob lize th d aph agm
3 Acetazolamide N N D (Diamox®) ca boni a hyd ase inhibitor has be n used to r d c th c bon dioxid cont nt a d the art rial pCO_2 in patients w th CO_2 r te ti a d

r p ato y acido is Although it i occa ionally b neficial t ha the d dvantag of i c asing total acido is The ual d e i 250 mg (4 gr) twic d ily

PULMONARY INFARCTION
(Due to Thrombus code No 360 511)
(Due to Embolus code No 360 512)

Pulmonary infarct on is due to an emb lus o thrombus occluding a b an h of th pulmon ry a tery A w dge h ped s f lung t s d stal t th occlu n b om inf lt ted with blood which ext va tes i t ai elle and pulmona y tissue

D g o i

Th gn and symptoms v y with th size f the blood ve s l occluded If th infa t is small ther may be no man f stations If l rg the mo t common finding are hem ptys ch t p in (u lly ple t c) nd dy pn If more ver th e m y b right he t fa lu e and death If p ti t su vives moderat or severe inf tion dy pnea h at pain pl u isy with or without ffus o and f ver become promin nt E g v d n e of right heart strain m y be v ry ea ly finding L ukocytosis and i cr sed ed m n t t n r te pe ist unt l the infa t n has h l d X r y of the hest may how a w dg shaped a e of on olid tion

Tr tm nt

When e a p t ent has a pulmona y mbolus suspect venous thr mb is nd institut imm diat ther py fo th thrombosi (s e p g 215)

A Emergency Me ur

1 Oxygen in h gh o entr tion p efe bly 100% (by mask) t o ercom ano Thi is help pr ve t a dio- r sp r t y f ilur
2 P p v in 30 60 mg (1/2 1 gr) and at opine 1 2 mg (1/60 1/30 gr) I V slowly and p at ery 3 4 hou This helps ve m th gen al pulmonary arteri lar sp m that oc u
3 Mo phine sulfat 8 15 mg (1/8 1/4 gr) or Mepe idine Hyd ochl id U S P (D mer l®) 50 100 mg (3/4 1 1/2 g) b ut r I V to h lp contr l pain
4 If shock i pr ent I V fluids hould be us d w th gr t tion b a e f po ibility f p cip t ting acute right h rt failur
5 If ut ight h art failu e dev lop V es tion should be p f rmed (s page 185)

B F llow up Tr tm t

1 Ob rv ref lly f ec da y nfect o a d in t t t a tib t tre tm t p omptly if a g s oc r
2 Tho ac t sis If pleural ffusi n o s and mba ras e e pir tion move by pa t is

P ophyl is

Th p ophylaxis of pulmona y inf ction onsi ts of the t at m t of v ou th ombosi (ee p ge 217)

DISEASES OF THE PLEURA AND PLEURAL SPACES

ACUTE FIBRINOUS PLEURISY (WITHOUT EFFUSION)
(code No 370 100 4)

Fibrinous pleurisy is most often secondary to an unde lying pulmonary disease Whe ever no apparent pr mary d sease is pr s ent always consider tuberculos s About 30 40% of case of so call d prim ry pleurisy actu lly re tuberculous d a large number of thes p tients develop active p lmo ary tubercul s within a 5 year period

D agno i

Acut fibrinous pl urisy can usu lly be d agnosed me ly from histo y of pain in the side of the chest aggravat d by resp ation The pain may be felt in the shoulder or referred to n k or abdom n in diaphragm t c pleurisy There may be other sympt m d pend ing on the underlying disease The signs vary d pend ng on th e tent and natu e f th lesion Many c ses h ve a pl u al friction rub b t this may be absent

Treatment

Treatm nt is aimed at the underlying disease The t e tm nt of the pleurisy is entirely symptomati and a m d at relieving th pain

A Analg s cs M y be us d as ne e y (s page 32)
B Ethyl chlor de spr y s local anesth t c is of v lu (pag 126)
C St apping of h st with dhesive tap may aff d relief by re stri ting movem nt
D Procain hydrochloride int rco t l block may be u ed in mor sev re cases

ACUTE FIBRINOUS PLEURISY (WITH EFFUSION)
(code No 370 100 8)

Most s of pl urisy with ffus on a e sec da y to pulmo nary d sea e How er there ar a sm ll numb r that are pri mary in the pl ura (h matog ou mplantat on of infection) *Whenever sterile pleural effusion is discovered without obvious cause consider it tuberculous until proved otherwise*

D agnosi

Th d agnosis is usually r latively simple when one makes se of physical d agnosis and x ray examinat o s Howe er at t m s it may be imposs ble by th se means to d t ngui h b tw en fluid and th ckened pleura the can only be differ nt ted by p f rming a diagnost c thoracent s s

If fluid is dis ove ed in the pl u al sp e ascert in its natu and the pr s nce of infecting organisms

A Removal f Flu d for Examin tion
1 Remove 50 500 cc Us a two w y t pcock to avoid int o duction of air

2 Inj t 50 000 100 000 units f p nicillin in 10 cc s lin i to th pl u l sp c th ough the sam n dle This is fo e ther p phyl x or actu l the apy

B Pl u l Fl id E m t on

1 Gr s am nat on Take sp cific grav ty to d te mine if ud t o t ns dat

2 Sm a and sta n f r d tect on of organ sm and n t e of ell lar ontent C lle t a specim n in an ant o gul nt f r ll ount

3 Cult e on app p i te med a d inocul te guin a pig w th all fluids f m un xplain d pl ral effus o s to d m nst at p s e f tuber le b ll o fungi

4 Path log cal e am n t on of c ntr fug d button in s p t d ca es of mal g an y

Treatme t of Po t p eumon a d Oth St l Eff s

A Spec fic M u All prophyl ct meas e ar d ect d at th pr mary d sea e B gin o ntinu ant b t in dosage a fo tr tm nt of pneumo a (see pag 122) until pat e t has b n feb il for 10 14 d ys r flu d is almost e ti ely r so bed

B G l M s re

1 Th r ent sis Wh ev r a ch st tap is perf m d instill 50 000 100 000 un ts of peni ill n in ster le s lin

a R m v daily obtai bl fl d by mult pl th r ce t s at d ly inte v l if ne s ry R m val f mor than 1000 at a tim is not ad i ble

b Re amin pl ur l fl d to r le out mpye n if the pl r y doe not r po d t tr atment

2 B d r t until p t t s feb ile

T e tm nt of T be c l Eff n (od N 370 123 8)

A Sp f M a s U compl at d p mary ff o s t t d t lly m nim l p lmo a y t b ul is A our e of o z d dami li yl a d (PAS) is n d d st pto my in is mm d d (ee p g 133)

B C l M

1 B d t indicated as for mi im l p lm n ry t be ul i

2 Tho c te s R mov l of all r d ly av il ble fl d (e b) ad i bl to m m e l t thi k d pl u a

3 Wh h gh f p ts l g th tw we k h matogeno s dis emi tion hould b su pected

C Follow up T tment C eful follow up fo a 5 y a p iod is n s ry be m y p t nt w th p im ry t be ul s ffu ons d lop p lmon y t b r losis lat usu lly w thin 5 y

EMPYEMA (code No 370 100)

Empy ma u lly onda y to p lm ry i f t b t may es lt f m di ct ont min t n f th pl r l pa thr gh t n thor t is Th pat nt u lly q t ill and th o f b l and e

DISEASES OF THE PLEURA AND PLEURAL SPACES

ACUTE FIBRINOUS PLEURISY (WITHOUT EFFUSION)
(code No 370 100 4)

Fibrinous pleurisy is most often secondary to an underlying pulmonary disease Whenever no apparent pr mary disease is pres ent always cons der tub culosis Abo t 30 40% of cases of so called primary pleurisy actually are tuberculous d a large number of these patients d v lop active pulmo ary tuberc l is within a 5 year period

Diagnosis

Acute fibrinous pleurisy can usually b d agnosed mer ly from history of pain in the side of the chest aggrav ted by respir tion The pain may be felt in the shoulde or ref rred to neck or abdomen *in diaph gm tic pl urisy There may be other ymptoms* d pend ing on the underlying disease Th s gns vary depe d g on th ex tent and nature of the l sion Many case h v pleu l f ct on rub but this may be bsent

Treatm nt

Treatment is aim d at the underlying d e Th tr atme t of the pl urisy is entir ly symptom tic and m d t rel eving the pain

A *Analgesi May be u d as necess ry (page 32)*
B Ethyl chlor de spray s loc l anestheti s of value (see p ge 126)
C Strapping of h t with dhesive tape may afford r l f by r stricting movem nt
D Procaine hydrochloride int rcostal block may be us d in more seve ases

ACUTE FIBRINOUS PLEURISY (WITH EFFUSION)
(code No 370 100 8)

Most c s f pleu sy with effus n a e seco dary t p lmo na y dis ase How ve there a e a mall numb r th t e pr mary in the ple ra (e hem togen us mplantat on f inf ct on) *Whenever sterile pleural effusion is discovered with- out obvious cause consider it tuberculous until proved otherwise*

Diagno s

The diagno s i usually l tively s mple wh n one makes use of physic l diag osis and x r y examin t ons However at time t may be imposs ble by these m ans t d stingui h betw en fluid and thicken d pleura these an o ly b differ nti t d by p fo ming a diagnosti thor centes s

If fluid is d s ov red in th pleural pace e t in its n t e and the pr sence of infecting o ganism

A *Removal of Flu d fo E amin tio*
1 R move 50 500 cc Use a two way stop o k t a id intro du tion of ir

SPONTANEOUS PNEUMOTHORAX (code No 306 900 5)

Spo tan ou p eumotho ax sually is c us d by rupture of an mphys matous bleb when o und lying lung d s ase is p es t It al o one of the complic tio of tub culos Alw ys inv sti g t f t b r ulo is in a y cas of pontan ous pneum tho ax

T eatm t
A Bed re t until ir has be n largely re orbed If t b culosi is present tr t a c d ngly
B Symptom t c tre tm nt s indi ated
  1 Pleu al pain should b tr t d w th an lg ic st apping o thyl chl r de spray (e pag 126)
  2 Co gh If ther is no und rlying pn umon tis and ough i ann ying od in 0 015 0 06 Gm (1/4 1 gr) every 3 4 hour should be u d
  3 A pi ate ai if ymptoms sev e If pn motho ax on tin es to re a cum 1 t an in lying dl r c th ter at ta h d t a wat r t ap (se b low) mav b n c ss y
  4 Adm nist oxygen if dyspne s pres nt
C S rge y In som cas s of po taneou p umoth rax wher the lung does ot xpand or wh e ther a e r peated pisod s f oll p e explo to y thor cotomy m y b n essary

TENSION PNEUMOTHORAX
(From Lung code No 300 400 4)
(From Chest Wall code No 377-400 4)

This is a medical emergency Th s re ult f m a valv like ction of th pl u l s f es of ither th lung or th ch st Ai i s ck d into th pl ur l sp c f m the o ts de o f om th lung dur ng inspir ti n and annot p d ing expir ti n Un l ss t eated imm d tely d ath may result

T tm t
A Em rge y Tr tment
  1 Pl sh rt b el d n dle int th ant r p rt f th aff t d chest ins rt th n edl j st i to the pleur l spac to id traum to the xpanding lung The nd of a rubber glov fing r sl t at th t p m y be ti d over the h b d of the n dl to a t a a simple one way val e A soon s p s ble onn t th n edl to a ubb r t bing and pl c th othe end of th t be unde 1 2 cm of wat r in s itable ont in As oon as f sibl a rubbe cathet r ntro d ced into th pl l p by m ans f a t oca sh ld b s bstituted fo th in lying n dl
  2 If pain is ev r g ve mo phin s lf t 8 15 mg (1/8 1/4 g) I V r I M imm d tely
  3 T eat h k if p t (p g 27)
B Foll w p T tm t As fo spontan ous pn umotho ax (ab)

Treatment

A *Specific Measures* Systemic administration in high d sage of appropriate chemotherapeutic or antibiotic agent as determin d by examination of infecting organism Treatment hould be continued for 10 to 14 days after patient s afeb ile or fl id has become sterile (see pag 514)

B Daily thoracentesis should be p rformed emo ing as mu h of the purulent material as possible Frequent physical ex mina tion of the ch st with x rays must be done to avoid overlooking any loculated areas (po k ts) of purulent mater l

1 Irrig te mpyema cavity with 500 2000 c salin
2 Instill 100 000 200 000 units of p n cillin and 0 5 1 0 Gm of streptomy in in 10 cc lin into the avity t the omplet on of the irrigations Continue da ly until fluid in vity h been ste il for 10 14 d ys or until fl d can longer be obtained
3 *Va ious enzymat c agents h v r cently been prepared* which digest the protein mat r al e p lly the f brin that f rms in this cond t on These ar also int oduced d rectly into the th ac c ca ty The prin p l ones available ar trypsin *(Trypta ®) and t ptokin se t ptodorn e (V r das ®)* Trypsin acts by d ge ting all n n l ving p t in mat ri l The streptokinase strept dornas attacks mainly fib in

C Surgi al d ain ge is nece sary if patient does not improv in a few day or if pus be ome too th k to a p rate with a n edle

HYDROTHORAX (code No 370 522)

Hyd othorax is most gen ally due to conge tive ardi fa lure Tre tment s direct d at the f ilure tself In cas s of respirato y embarr ssment r moval of the fluid is necess ry

HEMOTHORAX (code No 370 532)

H mothorax is most omm ly d to t a ma World War II e perienc has hown that p ratio and rrigat on of the blood from the pleu al ca ity i the t eatment of choice Rep ted aspi ations ar pe formed as n cessary If bleed g ntin e thor otomy is i d cat d Gr at are m st b tak in th se a pi t o to avo d possibl b ct rial ontam n tion of the pl u al c ity The prot lyt c e ym (se abo) may be sef l aft r ble ding h stopp d Su g cal emoval of r d al blo d clot may b neces ry

PNEUMOTHORAX

A r in the pleural sp ce an occur as esult of air ente i g through an open ng in th ch st wall (i e by a t f ial pne mo *thorax or trauma)* or as a sult f air e tering f m a te in the lu g

SPONTANEOUS PNEUMOTHORAX (code No 306 900 5)

Spontane s pneumothorax u ually is aused by r pt e of an mphysem t s bleb when no unde lying lu g d s as is pr ent It is lso o e of the c mpli at ons of tub culosis Always investi g te for tuberculos s n any c se of spo taneo s pneumoth r

T tm t

A B d rest unt l a r h s been la gely r so b d If tube culosis s pres nt t e t a o dingly

B Sympt matic tre tm nt as indic ted

1 Pl ur l pain sh uld be tre ted with an lg ics st apping or ethyl hl id sp ay (se p g 126)

2 Co gh If th r s o und ly ng p eumo tis and co gh i annoying odein 0 015 0 06 Gm (1/4 1 gr) ery 3 4 hours sh uld be us d

3 Aspir te ir f ymptoms a e e re If p eumothorax on tinu s t r ccumul t an in lying n edl or thete at t h d to w ter t ap (e b low) m y b e ss ry

4 Admini t oxyg n if dy pnea p es nt

C S g ry In m c s of sp ntaneo s pneumoth rax wher th l g do s n t xpand o wh re th r ar r pe ted p sodes of c ll ps xpl r to y thora ot my m y b n es ary

TENSION PNEUMOTHORAX

(From Lung code No 306-400 4)

(From Chest Wall code No 377-400 4)

This is a medical emergency This esults fr m a valv lik act on of th pleural su fa es of th r th lu g o th chest A r s ck d into th pl ur l sp f om th t de or f om th lungs d g inspi ation and cannot es p during exp r tion Un l s tr t d imm d at ly d th m y sult

T e tm nt

A Em g y T eatm t

1 Pl a h t be el d n dle nto the ant rior p t of the affe ted he t in rt th n edl j st i t th pleur l spa t vo d t urn to the expanding lung Th nd of a ubb glov fing slit t the tip m y be t d ove th h b nd f th n dle t a t a a simple on w y val e A s on p ss bl onn t th n dle t a ubbe tubing and pl the othe nd f th t be und 1 2 m of w t r in a s itabl ont in As oo a f s ble a rubb athet r intro d ced into th pl u l p by m an of a trocar sh ld be s b titut d fo th in lying n edl

2 If p in i e g ve m rphi sulf t 8 15 mg (1/8 1/4 g) I V o I M immed tely

3 T t hock if pr ent (e p g 27)

B Follow up Tr tm t As for spo tan o s p eumoth rax (e b)

TRAUMATIC PNEUMOTHORAX (code No 377-400 3)

This is an emergency Larg open chest wounds (i e suck ing wounds) are the most severe The opening must b made a tight by any available means i e bandage handkerch f shi t or other material and closed surg cally as so n as po sible

CORRECTION OF HYPOXIA AND OXYGEN THERAPY

Oxygen th rapy consists of the administration of oxygen at on centrations greater than are found in th atmosphere I crea d concentrations are ind cated only when hypoxia xists The cor rect on of hypoxia doe not always req ire oxygen the apy In f t in some cases of hypoxia oxyg n therapy may b dange ous if ot adm stered p operly

Oxygen th rapy is always palli tive It is ge erally sed to tide the pati nt over an emergency s tuation wh le the underlying cause is being corrected co rection m y not always be possibl When ver resp ration ceases resuscitation must be instituted

A classifi ation of the mo common caus s of hypoxia and methods for their corr ction a e found in the chart on page 146

Dangers of Oxyg n Therapy

Altho gh m ch ha been wr tten about the dangers of oxygen therapy the principal danger appears t be dep ession of respir tion in severely hypoxic pati ts who have an elevation of CO_2 te sion in the blood In these ind viduals the respi atory enter n the medulla has been anestheti ed by th high CO_2 tens on and respi ation is under c ntrol of the ch moreceptor cent rs respon siv to oxygen te sion Therefore wh n high concentrations of oxygen are given the chemor cepto centers a e no l ng r stimu lated and there is a r sultant d crease in pulmonary ventilation which may caus enough CO_2 etention to produce narco is unc n sciousness and even death This usually occurs within a few minutes after starting high concentrat ons of oxygen but may o cu ven up to 1 2 hours after instituting tr atme t Th r fore no pati nt hould b given o ygen unless h is unde close observation during the first 30 mi tes of oxygen administrat o and ny p ti nt with suspect d levatio of CO t nsio should have a nurse in n stant attenda e and if possible some m thod of mechanical ventilation sh uld be k pt available

Treatment of Hypoxia Ass ci ted With CO_2 R tention

Thi s tu t n may b man g d in n of two w ys

1. Oxyg n may b admini t d by means of n aut matic mechanical pr ssure d vi e (e g body respirator Benn tt apparatus cycl d ith automatically o by an atte dant) *This is the more effe tive method bec e it p omotes ade* quate v ntil tion the CO_2 is remo d more rap dly
2. If high conce t at ons a e not ne ded imm diately redu e oxyg n concent at ons in r as g slowly a CO_2 i remo ed

Oxygen Toxicity

Altho gh much has been written about o yge toxicity there appears to be little evidence of ts clinical oc . Many of

eport d in idenc of o yg n to i ity h ve b n cases of irrit tion resulting from improp ly humidif d oxygen

TECHNIC OF ADMINISTRATION

When oxygen therapy is used proper humidification even aerosolized water or saline must be maintained

OXYGEN AT ATMOSPHERIC PRESSURE

Oxyg n is most ommonly admini ter d at tmospheric pres sur It is indic ted when hypoxi can be controll d adequat ly by th mean alone For ndications ee p ge 146

Variou m thod of dm ni te ing oxygen at atmo ph c p s r ng ne l us B low are t bulat d thos m thods whi h a m e ommonly us d with adults and th oxyg n con entr tions whi h an b a hie d

Method	U al Oxyg n Con ent t on	U ual Rate of Oxygen Flow (L /min)
T t	40 50%	Fl h t 15 30 M int in at 12 15
Cath t		
a N oph yngeal (met l o rubb)	20 40%	6 8
b Or pharyng al	30 40%	6 8
M k		
a BLB o equival nt	80 100%	8 10
b Expend bl plast m k	40 60%	10 15
c OEM o Benn tt f m k	80 100%	6 8

Oxyg n Tent

A Ad t g

1 G ve mod rat co cent ations of oxyg n at maximum om fort to the p ti t

2 Can b us d w th tl s and un ooper tive pati t

B D s dvant g

1 M t pen iv t b y and to ope at

2 Cannot a hi v h gh con e t ations of oxygen

3 If ot ope t d p ope ly oxyg c nc nt at n an e ily f ll and ca bon d oxid is likely to cumulate

N al C th t

This pparatus on i ts of a u eth al thet (Fren h No 10 12) with 4 6 mall hol in the te minal inch a r du tion valv me hanism and a humidifi r bottl A bil t al plastic r metal an ula wh h ext ds about 1 in h int th e i al o a all ble

A T hn

1 Th th t hould be l an d lub i ted with pet olatum and pl d v ry 6 12 hour

HYPOXIA COMMON CAUSES AND METHODS OF CORRECTION

Physi logi al Cla ific tion	Clini al Conditio	Treatm t
Hypoxia With N m l Lungs		
Defi i nt atm sphe ic o yg	H gh altit de flying	Oxyg at atmosph ri pr s re
	Gas ulfoc t (t poi oni g)	R iau at m s ph ri pr e
Ai way obstru tion	For ign bodie Atel ct sis du t m s pl g Paraly s r w k ss of lary g al pha yn g l r tongu m i D wni g	Clear the a w y O yg n t usually n eded R us itat
P aly i w kne of r pl t y m s l	An th si P li myeliti	R su i
Pa lys of e p to y te	El t sho k poi o my li s	R iau
Hyp xi With Abno m l L g		
Dimi i h d n mb of functioning alve li	Pn mon	Oxygen at atmo pheri p e
	Emphy m t lectasi	Oxyg by in mittent positi p r t atmo ph i p e
Improper m x g pen tration of insp red ga s	Emphy m br hi l asthm	Oxyg n by in mitt po ii pr
Imp i d diff acr ss l e la m mbran	Pulmo ary d m	O yg by int rm t t po iti e p s re (m an p e ure alw y po iti)
V ous Art ri l Shunt	Cong ital heart disease	O yg n i n lpful ly f fail s pre t
Hypoxi D e to In d qu t Oxyg n Transport by Blood		
Diminished et h mogl bin	A mi	C ct m
	CO po oning	O yg n at tmosph i p r it tion
	M th m globi mi	A f CO Al m thyl bl bl id
Impair d i ul t on	C g i f l e p lmon ry d m	Oxyge t atm ph ll pulmon y dem i p po i p s
	Sho k	Oxyg t imosph ri pr s r po iti and g ti p u Do t e nly po iti p u in h k
Hypoxia D Impai ed Ti s Oxyg s ion	C ll ia nzym p ni g (y d fl o ide)	R s it tion Oxyg t mo ph i p App op iat tid t s (pag s 539 d 540)

2 It m y be plac d in the n sopharynx or 1 2 i h s into the n re but conc ntration ar usually only about 25 30%
3 Pl ce in oropharynx for onc ntrations up to 40% To cal culate the approximat d stan e th tube must be inserted, mea ure th dista e f om th ext nal na es to the t p of one ar lob u ing th tub to mea ure with Th n pa s the tube through the nose into th oropharynx When th patient begins to swall w withdr w the tube bo t 1/2 in h and s cu e it in p sition
4 The binasal annul gives concentrations about th same a hiev d with th si gl oropharyng al eth ter

B Advantages The nasal c th ter is the cheapest m thod of adm nistering oxygen and is mo comf rtable than a mask

C Disadvant g V ry high on ent ati s of oxygen a e not obtainable and muc sa may dry with ordinary humidification

M k

A Appa t e

1 BLB masks N al or oro asal r bbe ma k with rebre th ing b g The dis dvantage of thi m sk is that with low flow of oxyg n (under 6 8 l t r per minut) CO_2 tend to accum ulate The e may also b re istanc to inspir tion f om flat r br athing bag

Exp d bl plastic masks R quire h gh o yg n fl w Low oxyg n conc nt ati n hi ved.

3 OEM and Bennett fa ma ks Similar to BLB mask but do not p mit r br athing int b g utiliz s flutter type valve so r b eathing of CO_2 is not possible

B Ad ant g of M sk

1 High t o t atio s of oxygen obt in ble without th us f p s ur (ex ept fo plastic m sk)
2 Both OEM and B nn tt masks hav inj to settings s that oxyg n con e t ati n an be vari d f m 50 to 100%

C D advant g Tight fitti g masks annot b tole at d by s m pat ent

OXYGEN UNDER PRESSURE

V iou p e ur b athing devices h e be n dev loped which allow oxygen to be administer d unde slight p iti e pre sur dur ing the inspir tory phase Although iginally the e devic s were mploy d f r esu cit t on (ually with a n gativ pr ssure phase in xpiration) the alue of intermitt nt po itive pr sur in the t eatment of v rious a ut and ch onic p lmona y and cardia con ditions w soon c gni ed

Phy i logi l Eff t

Th p m p l physi logic l effe t of oxyg n administe ed by pr s ure m thod ar s follows

1 H lps overcome esi tanc to gas flow and wide s the bronchiol permitting m re efficient cough and b onchial drain ge
2 In re s int apulmon ry mixing cr ating mor unifo m alv la a tion

3 Decreases residual volume
4 Inhibits fluid extravasation into the alveoli (hen e of aid in pulmonary edema)
5 Interferes with venous return to the right heart with conse quent decrease in cardiac output and blood supply to the lungs This latter phenomenon is of val e in management of conges *tive failure* especially with associated pulmonary edema In shock on the other hand it is a d sadvantage and often contra indicates the use of positive pressure devices in this condition

PRINCIPAL METHODS OF POSITIVE PRESSURE BREATHING

Method	Pressures During Respiration	Indications and Uses	Remarks
Mouth to mouth or mouth to ndotracheal tube	Pos ti e pres sure in in spiration	R suscitat on especially useful with children and newborn in fants	Most p i n t e method of positive pressure but may be very eff c tive Oxygen admin istrat on at lower than atmospheric concen trations
Bennett positive pressure therapy unit (motor or oxygen powered)	Pos tive pres su e in inspi ration May use oxygen air o oxyg n h lium mix ture	Mainly for therapy of chronic pul monary dis eases Also usef l in pul monary edema	Int rferes with v nou r t rn to right heart so ontraindicated in forward failur E pe cially useful in hypoxia due to improper mix ing of gases and f r pushi g oxygen across *impaired m mbranes* (see page 149)
Oxygen i jector mask (Barach) metered for positive *pressure*	Positive pres sure in expir ation Used with oxyg n	Advoc t d for pulmon ry edema	L ast eff c ent P s itive p ess re applied at wrong place in r spirat ry cy le to be of benefit Also very tir ing to breathe against resistance
Commercial r suscita tors of the suck and blow type *Stephenson* Emerson E and J etc	Pos tiv p es sure in in pira tion and neg tive p ess re in expiration G ner lly em ploys oxygen	R uscitation	M t ffecti e means of resuscitation Le st inte f rence w th cardiovascular dynam ics although the usual pressure r lationship *in inspiration and ex* piration is r ersed Neg tiv ph se may caus pulmonary edema in pr disposing condition
Kre selman hand bellows or Emerson bellows	Posit in in *spiration*	Resu c tation	In xp nsiv resu c t tor useful mainly wh n more xp nsi e apparat s s a e not av il ble

B nnett Pos tiv P r Th r py U t

Th B n tt un t is on of th m t eff ie t of th av ilabl pr r b e thing devi es It m y b us d with an i term ttent nebul er o w th M st O_2 G ® ti u us bulizer fo good h m d if cation (o fo adm nist ati n of v rious antib oti s va odilato s and s f ce t ns n lowering g nts) It s a p rti ula ly us ful w y to adm ster aer s ls f t dr es th m down to th terminal b onchiol and alv li Ex lle t instruct n are suppli d w th th un t A p al appa tus als m de that cy les aut mat lly Clinical ind c tio and us s a as f llow

1 B chi l sthm E pe ally w th br nchod l t r u ef l mainly in th acut att ck
2 Chr nic mphy em id opath c or ac ompanying f b s s p um o o is et B st res lt app rently whe bro chodilat s e used Mu t b sed aut usly or w th ut mati cv ling in patie t w th s v re hypoxia nd ele v ted CO_2 tensi n (S dan ers of oxyg n th apy p ge 144) In th cond tio s th rapy m t b employ d 2 4 t m d ly fo bout 20 min te per tr tm t T e tme t gi in o es f 5 30 d ys whi h m y b ep at d as dicat d
3 Bron h t s A fo mphy m ab Ant b ot cs by os l a oft n ful n th s c nd t on
4 Pulmo ary ed ma Esp ci lly u f l wh n s oc ted w th s e a ox M st b s d w th gre t ut on if sh k (f rwa d fa l) is pres nt
5 I r t tung g s and fum s V y lu ble spe ially with any ted pulmon y dema U e u t l lungs h ve lea ed
6 Atel tas Se p ge 137
7 R p tory d p o M st be u d w th ut on f culato y f l re als p se t
8 R ght hea t f ilur Helps t hypo r i ve b rd n n r ght hea t Ex ll t in m n g m nt f t ght he t fa lu in or junct w th th m s r (se pag 181)

Ca ti n

Th B ett ppa at m t be u d w th g e t c ut on in all cas of p phe al ul t ry ll ps r h ck (f w d failu)

MAINTENANCE OF RESPIRATION BY ALTERATIONS OF CHEST WALL PRESSURES

Alth gh fail of v t l ti m y b c ted by p s e b thing d e ppli d t th a w y th m th d s n t lw ys ad ly avail ble d t b mpl y d fo lo g p ods f tim In e h as p t on c b m intained by pplying p essu ti n t the he t wall Wh n th s m thod re mpl y d th n rm l t pl u l p s e lat ship m ta ed r fer e t tm sph i p ss Th s l m th d s e o tl n d on the foll wing pag

PRINCIPAL METHODS OF PRESSURE ALTERATIONS TO THE CHEST WALL

Method	Pressures *During* Respiration	*Indications* and Uses	Remarks
Artificial respiration	The b st meth od to use is to pull on arms to expand ch st for inspiration pressure for *expiration (see below)*	All re pi a tory failures when no oth method is available	E t ly phy iol gical when proper method is used (see page 151)
Body respirator	Negative press re (suc tion) for in spiration usual ly used May use positive pressur (x piration) in attempt to overcome venous pooling	Respiratory failure when prolonged aid is needed	Sin e negative p essure applied to entire body may diminish cardiac filling due to pooling of blood in extremit s and trunk may be *dangerous in forward* failure
Cuirass respirator		As for body respirator especially in c nvalescent or stabilized poliomyeliti	Mo e physiological than body respirator L ss inte ferenc with cir culation Often uncom fortable or hard to f t for p olong d time U satisfactory in rly seve poliomyelitis
Rock ng bed	Resp rat on controlled mainly by abdominal *c ntents drop* ping away f om or pushing diaphragm	Le se de g ees of re spiratory failure as *above*	Mo ment excell nt f r improving circul to y dynami s and r nal dr inage in p tient w th mbined spi tory nd body p raly is

ARTIFICIAL RESPIRATION

Art ficial respiration must be administ red promptly to pe son whose respirations have ea ed wheth r d e to drowning uf focation electric shock or other a ident l cau e *Manual artificial respiration should never be postponed while wait ing for the arrival or institution of treatment with a mechanical resuscitator*

This pro edure repl c s spontaneous re piration and provides oxygen to the tissues until the pa alyzed r spirat y center re covers and res mes its normal function As long as the hea t c n tinues to beat the patient *has a chance of re ov ry and this may* occur even after many hou s of artificial r spiration

The push pull methods of artificial r piration ar more than tw ce as effective as the simple *push m th ds (e g Schafer)*

The g ne ally approved m thod at p esent is the arm lift-ba k pres ure (Nielse) the hip lift-back p essur and the arm lift-chest pressure (Sylvester) methods are less efficient than the Nielsen m thod but are pr ferable to the simple push methods

Gen al P oc dure

A *Clear the airway and begin artificial respiration at once* a d lay of only a minute or two reduces the vi tim s opportunity for recove y

B Do not stop artifi ial respiration until normal respiration is established or until rigor mortis begins

Technic of the Arm Lift-Back Pre sur M thod (Nielsen)

A Po t n of P ti t The pat e t i plac d prone w th his head turned to one sid and resting on the backs of his hands

B Position of Operator The operator kneels (on either or both kne s) at the patient s head and then gr sps the patie t s rms t a point between the lbows and the shoulders

C The R te of Res s it t on The rate of resuscitation is main tain d by 10 to 12 omplet cycles a minute This r te an be tim d by a wat h o by c unting th following numbers 1001 1002 1003 1004 1005 1006 and the repeating This man ner of counting requi es about 1 second for e ch number Thr e se onds hould be llowed for ach arm lift and f r the



1 Pl e hand f r arm-l ft



2 Rock backward and l ft arms



3 Pla e hand for ba k pre su



4 Rock f rw rd and pre back

The Arm Lift Back Pressure Method of Artificial Respiration

back pressure When possible operat rs should be alternated at 20 to 60 minute *intervals*

D Procedure of Resuscitation
1. Arm lift The operator lifts the patient s arms upward and toward himself as he rocks backward on his knees The arms of the operator are k pt straight during tl e entire pro cedure This arm lift enlarges the thoracic cage and causes inspirat on The arm lift is continued until resistanc is met the patient s arms are then returned to the ground and the operator places the palms of his hands on the pati nt s back
2. Back pressure With the palms of tl e hands on the lower part of the shoulder blades and the fingers extended over the thoracic cage the operator rocks forward on his knees and with his arms straight exerts hard pressure directly down ward on the thorax until resistance is met The cycle is then repeated

Mechan cal Resus itators

In ompetent hands mechanical resuscitato s are more ffec tive than and should replace manual artificial respirat on as soon as available at the site of em rgency How ver t should be empha sized that a mechanical resuscitator should only be used by trained personnel and when it is in proper mechanical cond t on

AEROSOL THERAPY

There are two types of a rosol th rapy intermitt nt and tinuous Intermitt nt th rapy s the more commonly used Recent work sugge ts that continuous administrat on of water or sali e by mists of f ne part cle s ze allows for better humidificat on with l ss irritat on from oxygen and appears to be more physi logi al than ste m inhalations Co tin ous aerosol should p obably be employed in all conditions where ther a tual pote tial tra heo bronchial irr tation Surface te ion lowe ing age ts ant biotics and bronchodilators may be used by this method

The administration of antib otic ag nts by aerosol inhalat n has been of value in some lung infections Certain p ces of quip ment are n essary in o der to adm ni t r aerosol th rapy

A Nebuli ers produc ng pa ti l s smaller than 8 to 10 μ in diam eter The most sat sfactory nebulizers are the Vaponephrine® model and th De Vilbiss No 40® For continuous administ a tion of aerosols apparatuses with larg r capa ities are avail ab e (e g Mist O Gen® Humidox®)

B Sourc s of Pressure for Nebul zing Drug
1. Oxygen from a cylind r at 6 10 lit rs p r minut is u ually used
2. Compress d air from a d phragm type compressor (Caution Do not u e an il sealed pump)
3. Manual pumping devic s (e g foot bellows or pumps) hav been employed but are *generally not very useful as they tend* to tire th patient and are ineffic ent
4. Nebulizer with hand bulb may be employed but is qu te in efficient because it does not produce an a osol loud for a sufficient length of time

C Drug and C ent tions Employ d (Should b prepa d f sh daily) Th f que y and d at n f tr atme t dep nds upon the d eas and t s v rity

1 Antib otics

a Pen llin Usual dose is 50 000 100 000 units pe treatme t Dilute in 1 0 2 0 cc of w t r

b St eptomycin 0 25 0 5 Gm in 1 0 2 0 cc of wat r Oxytetra yclin (T r amy in®) a rosol 50 100 mg in 1 0 2 0 c 75% propylene glycol

2 En ym

Although tryp in (Trypt r®) ha b advocat d to d lve thi k ten ious m us or dead t su in chronic b onchitis or b onch cta i untowa d r ctions and b arre changes in cell h v been ob erv d with ts u It must be us d with gr at uti n follow ng instructio s car f lly Do ge 1 3 c f trypsin ol t n (40 000 un ts/) prep ed by dissolving th d y powd in a sp al buff r (pH 7 1) Administ 4 times d ily f up to 4 5 days f r ach o e D ot employ w thin one week after f ank h m rh g M y be ombin d with p ic llin t ptomy in and bron h l dil tors

b Oth ym h v b e u d[g des xy bo ucle s (Dorna e®)] b t mu t st ll b on der d expe im ntal

3 Br nchodil t rs

a I p ot r ol (Isup l® Al drin ®) 0 1 0 5 f 1 100 or 1 200 ol t n

b *Epin phrine (adr nal) 0 5 c f 1 100 lut on*

4 S f c t ns on lowe ing ag nts V ious rf e ten ion l w r g ag nts hav be advi d to a d in sp e ding and f mation of osols Th r valu s till uncertain *Am ng the dr gs e Al vair ® ethyl al h l tc*

D M th ds f Adm ni t ation

1 Oral nhal t n d ng inspi t ry ph F th gre t st ff t d ffic n y th a r ol ho ld be inhal d th ough the mouth

Co ti uou p s f m xyg n tank A Y tub s rt d b tw en b li r and ur of p ss re Nebul z t n w ll c u o ly wh n th attach d e d of th Y tub s l ed by the thumb a f g the e lly a f w cond d lay befor th e ol ar v at the mouth p

b Int mitt t p ss e (g foot b llow p mp) is pplied du ing inspi at n

2 If th p t nt is u abl to op te th b li r may be s d w th an xyg n m sk wh h b s a b thing bag at t h d Th n b l pla d b twe n ma k and oxyg n

Chapter 7

DISEASES OF THE HEART*

CONGENITAL HEART DISEASE

Congenital disorders of the heart which are amenable to surgical co rection are presented below

Although in many instances the diagnosis of conge ital hea t dise se an be made on cli ical grounds alone *most cases requi e* special studies which are best p rform d in medical centers Such procedures as c diac theterization venous and retrograde arterial angiography a d tomog aphy a e ot suit ble for the occasional invest gation they are diffi ult to perform and interpr t and require skilled t amwork

Curative intra ard su g ry with a pump oxygenater s now feasible with a aso able mortal ty r sk n a f w med al cente s It is the proced re of cho ce fo tetral gy of Fallot ventricular septal defe t p lmonary ste os s with no mal aort root atrial septal d fect with an osti m p mum defe t nd onge tal ao tic *stenosis* Not all p tient with the e conditions requi e repa ative s rgery however

Tetralogy of Fallot (code No 413 0x0)

All children w th th tetralogy of Fallot should be op ated pon because so few r ach the age of 21 if unt eated Sync pe i an urgent indication for op ratio Beca se of the higher ope ative mort l ty rate in the adult age group pat ents o e the age of 21 are operated upon only if they a seriou ly disabled

P lm a y Stenos s With Normal Aort Ro t (c d No 413 0x0)

Th s nd t on f rm rly co side ed r i ow recogni d a being one of th most common congenit l lesi ns Dependi g upon the severity of the les on the patie t may be asymptomat c or m y show all degrees of cardi c dis bility up to severe ardia failure with low cardia output

If severe ste o is is manife t (right entri ul r systol c pressure of at least 100 mm Hg and progres ive ght ent i lar enlargem nt) surgi al tr atment i dic ted

If the steno is is mild the patient may be asymptomat c for years

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*For d ugs used in treatme t of rd'o a ula dis e pages 195 to 206

T usp d Atr sia (ode No 452 017)

Th co d t on r ogni ed by the combin t on of a c ntrally y not c o genit l he rt lesion a dominant a wave in the v nous pulse a d vid ce of l ft vent icula hypert ophy cli ically and el ctr c diog aphically A Blalock an atomotic ope ation is th treatm nt of hoic

Pat t Du t s A t ios (de No 40 0 0)

This elativ ly ommon l io ar es se ity f om complete b en e of sympt ms to f ank rdi c failure

The ind c ti s fo ligat of a pate t d ctu art io s in the p e en e of pulm ary hypert s o h not be n established C r ent opi o favor lig tion wh ev th flow thro gh the d ct s is p rm n ntly or int m ttently from l ft to ight

Be use of th low op at ve mortality rate (less than 1%) in kill d hand d vis on a d los re is r commended in all individual under th g of 20 perh ps 30 The mo tality r te al o b omes high r s the p t nt becom s old Th ne ss tate c ut on in ec mmending s gery in adults who a e a ymptomatic and ha e no left vent icular hyp t ophy S ba ute bact i l end carditis is th m j r h z rd in this g o p

Co t t o f the A rt (de N 461 018)

Th nditi n i har ter d by l ti n f th sy toli bl d pr s in th rms b t not i th leg a weak d l y d f mor l pul e a omp r d t th adial d b chi l pul es a sy tol murmur h a d at the b e of the h rt ante o ly d post io ly and gns of llate al r ulation rcum ti g the onst i ted aort If th d t ils of the n row d ao ta n be vis li d the d gno is n b e t bli h d by et og d ca otid o b achial rt graphy o v nou a giog phy

R cti n of the c ted te i mo f mid ble op rati e pro ed e th n ligat of the patent d tu art o us and th sur gi al m tality is in the ghb ho d of 3% ev n in the be t hands Fo thi r o not all phy icians e mm nd ro tine re ti n in symptomati indi d al Th isks of the di s ar su h how ve th t if a kill d di logical su g is a llable ll coarc tat up to the ge f 20 yea s hould be r s ted B tw n the ge of 20 a d 35 urg ry is advi ble if ve ta make it cl r th t the pati nt is doing b dly

Atri l S pt l Defe t (code N 41 0xx)

Min r d g s of at al ptal def t do n t equire s gery S gery should b withh ld in seve e l ion w th pulmonary hyp t sion a d re s d shunt beca se of the isk of c te right h art f ilu e L i with l rg left to right hunt (mo e than 2 o 3 tim s y t mi flow) witho t in e s d pulm nary rt ial esist an e sho ld be ope ted po Th ex t p oced re of hoi e h t b tabli hed b t s tisf ct ry los e f the d f ct has be n a compli hed with trial w ll ir umcl n by a p rse tring di t t e und hyp the mia o c di c by pa s

A omalous P lm n ry V no D ge (ode No 486 02)

S g l co tion of total n mal s pulmon y v in drain g i ow pos ibl with ardi by pass t chni

Ventricular Septal Defect (cod No 413 0xx)

Vent icular septal defect vary in seve ity from trivial asymptomatic lesions with normal cardiac hemodynamics to extensive le s one causing death f om cardiac failure in infancy The former do not require surgery The ideal case for curative repair with ardiac by pass technics is one with a large left to right shunt left ventricular hypertrophy and only moderate pulmonary hypertension When severe pulmonary hypertension is present (pulmonary arterial pressures of more than 85 mm Hg) and the left to right sh nt is small the surgical mortality risk is about 50% If the shunt is rever ed surgery is contraindicated

HYPERTE NSIVE CARDIOVASCULAR DISEASE
(code No 400 533)

Hypertension per se is a manifestation a hemodynamic sign and the course of the disease is adversely affe ted by

1 Cardiac failure secondary to increas d work of the heart and relative or absolute coronary insufficiency
2 Th e development of atheromata esp cially in the ce ebral and c ronary arter e with syndromes r sulti g from vascular oc lusion
3 Acut vascular n ro es r sulting from apid sustained rises of diastolic blood pressure usu lly xce ding 130 mm Hg which prod e the compl cation known as the malignant phase Renal failure o cu s almost ex lusively in this last group

Evaluation of the Hyp rt nsi e Patient

Hypertens n is a nonspecif c a gn and may be present n riety of dis ases som of wh h are urabl or can be modified by treatment The first st p r the tre tment of patient with ele v ted diasto ic blood pr ssure s to r cognize co re t bl re ersibl onditions n which hype tension occu s These dis ases i clude u lateral at ophi k dney follow g part al o l n of th r al art y oft n w th pyelon phri is ob tr cti e ropathy ph chromocyt ma Cush ng s dis ase v ce al angi te coarctat on f th ao ta and acute glom ru a ph tis

The severity of the ascular hypertension and th integrity of the vital organs comm nly affected by hype ten o (heart brain fundi kidney) must be ass d befo e the apy c n be planned

Classifi at n of Severity of Hyp rt ns n and It Compli at ns

Hype tension m y be lassif ed a f llow

A S v re Papilled ma o s ft exudates in th fundi c di c failu e or disabling dyspnea dis bling co on ry insuffi ien y epeated cerebr l thrombosi with neurolog al seq elae rap d ly dva cing diastol c hype te si n with p ogr s ive l ft ven i icular hypert ophy
B Moderate Signs of l ft ventr cular hypert ophy a teri scle rotic changes n the fundi old erebral th ombos s w th s q elae ea ly contro led coron y insufficien y
C M ld Diastolic blood p essure b low 125 mm Hg with minimal or no objective signs of vascula damag in fundi heart brain or k dney

M th ds A ailabl fo Low ring Blood P essur

A D gs (S e b low) R w ifia ompo nds v atrum com pound hyd alaz e hydro hloride (Ap esoli e®) m lho um ompo nds and m camylamin (I si e®) and thiocyanat s a d n t ite Chloroth zide (D uril®) i a n w or l d retic which n bout 50% of ses redu s the dose requi d of ga gl o c bio ki g ag nts th vailabl d ta e sca ty D r l® dos g 0 5 0 75 Gm (7½ 12 gr) a d y in d ded do es ha b en us d with due ca tion for elect olyte d plet on

B Sympathect my

C L w lt r ce di t

D Othe (g psy hotherapy s d t on)

I d cat ns for Potent Hypot sive Dr gs and/or Sympath t my

A D f it I d ti

1 Mal gn t hype te io

2 Hyp rt s e rdia fail re wh n a t myo di l inf rc t on ha b n xclud d (f p s ble)

3 Rapidly advan g dia tolic blood p ess e with l ft e t c la hyp rt phy and d l t ti n Evid c of d teriorat n in th h t nd fundi (udate d hemor hage) sp c ally in young (p ticula ly m l) indi iduals

B P ob bl I d ti (Explo to y St g s)

1 R cur e t mild ce bral th ombos s w th n u l gi l e q l e d high di stoli pr s e

I t ct bl na y ns ffi ie y nd h gh dia tolic pr su

3 A ymptom t m n with di stol blood p es s betw 125 and 130 mm Hg b t without other evidence of complica tion of hyp t sion

4 Se e a i tractabl hyp t h d ch s n the ab n e f ob us emot onal t s

C N t I d t d W th Pr s nt Kn wledg

1 Mild be gn es e t l hyp rt i m ddle ged wom n w th ut object e d e of va ul det r at on or c m pl at o

2 E rly t s nt hyperten io in young i d id ls w thout obje ti e ide c of va cul d t io t on o c mpl t o

Hypot i D gs

M ny p t ts w th hyp te sion e p ially middle aged women live m y years n mfort The ef great ca e hould be e er is d a d l d t o of s gnificant dec e s in th spa of lif obta d b fo e ubje t g these p ti nt to the disag e bl side effe ts d p t ntial dang of contin s p g am of d ug the py Hype te on ari st iki gly i sev rity i diff re t p ti ts t e tm t at p nt should b va i d dep di g n th s ity of the hyp t s on nd the p n of mpl tion

Se l d g n w vailabl b t th i d at s f r th i e till t l a ly d fi d P t t with moderat or ev f m f th di e s h uld b gi e th benefit of a trial of th r py Us th l a t t xi d g fo mild hyp rt si Ov s p ri d of m ths y sl ght to mod t low ring of the blood p s u may pr v t o d c s o possibly e e se the va ul r mpli t ons f hyperte ion C mbinati f drug m y p o t be s f l b th y a diff ult to e aluat R wolf a is th b t t le t d th ompli tio s f m its us a e le st

In most severe cases ganglionic blocking agents should be considered but in some instances of less severe disease it will be worthwhile to begin with rauwolfia and then either add another d g or change to a more potent drug if rauwolfia s not effective

A <u>Rauwolfia Drugs</u> Ra wolfia has a relat vely slight hypotensi e action but may be useful because of its mild sedative effect and its value as an adjunct when combined with methonium compounds veratrum or hydralazine (Apresoline®) Altho gh t is the least toxic of the hypotensive drug nasal stuffiness may *be annoying Gastric hyperacidity* m y oc r *with larger doses* Sod um retention or severe depressio may occur in which case the drug should b withdraw Dosage

1 R serpine N N D (Reserpoid® Serpasil®) 0 1 *to* 0 25 *mg* (1/600 1/250 gr) t i d orally at onset Maintenan therapy 0 25 0 50 mg /day

2 Rauwolfia N N D (Raudixin®) (Rauwolfia serpentina whole root) 100 to 200 mg (1 1/2 3 gr) daily

B <u>Veratrum Compounds</u> These compounds ha e not received univers l favor beca se of the na row m gin between th ir *the apeutic and toxic effects nause* vomiting and weakne s M re recently purified preparations p rticularly Protover trines A and B N N D have been fo nd u ful especially in *hypertensive emergencies* In these tuations (heart fail complicating acute nephr tis the convul ons f eclampsia hype tensive pulmonary edema) gi e protover trines as follows

1 Acute hypertensi n

a I V 1 5 1 9 m g /*Kg* The hypoten ive effect lasts 1 to 3 hours

b I M 1 2 mcg /Kg every 8 hours

2 *Chro ic hyperten on* 0 4 1 5 *mg* (1/150 1/40 *gr*) o ally t i d o q i d aft r m als (aver g dose) The dose must be carefully regulat d t times a diff ence as slight as 0 5 mg may make the differ nce between dde vomiti g o the absence of toxic ymptoms

C <u>Hydralazine Hydrochlorid N N D (Apr solin ®)</u> The init al <u>dos g of this drug s 25 mg (3/8 g) orally t i d</u> p ogre ive ly incre sing to a *total dosage of 300 mg (5 gr) a day* The results of the oral use of this drug as a sole m thod of therapy are often not impress ve but some pati ts obtain a hypoten e *effect* Because Apre oli ® is the only hypotensive age t whi h increases the renal blood flow it may be u ful as an adjunct to oral methonium compounds (ga glion c blo king agents)

Toxic side effe ts are ommon The most importa t are h adache and palpitations with tachycardia A syndrome res m bling diffuse collag n disease has occur ed usually after l ge do s have been used for ma y mo ths

D *<u>Gangli nic Blocki g Ag nt</u>* The most f equently sed of the <u>agent ar P niol ni m Ta trate</u> N N D (<u>Ansolysen</u>®) Chlo isondamin Chloride N N D (<u>Ecolid</u>®) and M camylamin Hydrochloride N N D (I <u>versine</u>®) They can be us d orally subc taneously or intr v <u>no</u> sly At the p sent time with the exc *ption of Inversine*® the oral ro te has the disadva tage of small and irregular absorption from the g strointestinal tract with res ltant *unpredictable* falls in blood pressure

1 Bas c principl

a Hosp tal e p ti nt under close s pervis on

b St rt with small initial dose and in r as gradually depending upon the t leran e and respon e of the pati nt The deg of eduction of p es ure sh uld be only moder at in the first week o so and no attempt sh uld be made to ed e the p es ur to normal until it has been d mon trated that the p tient can tol rate ystolic p es ur s of bo t 160 mm. Hg w thout hypote sive symptoms

d Postural hypotension which i great t at the he ght of the ffect of the drug should be cons der d not only a a p tent al dang to tn patie t but also as a therapeut c we pon to prolong th hypotensive a tion of the drug after the peak effe t has worn off

2 Oral ga glionic blo king ag nt A tr al of 2 or 3 w ek i u ually r qu ed bef re the dose requ ed to lower the blood p ss e to a l v l approxim ting 160/100 mm Hg an be d termin d The pati nt may th n be seen as an out pati t nd the dose gradually incr sed to that le l wh h produ es the de ir d fall of pr su e Whether the desi ed level of pr sure at th time of p k action of th drug s in th range of 150 to 160 mm Hg sy tolic o wh th r t i th t whi h re sults in mild hypoten iv symptoms on standing has not be n det mined Constipation is to be avoided in p tie ts re-eivi g o al metho m compounds becaus it in ea e th absorption of th drug l xatives hould be given to en u a daily bow l mo me t

Although th d t rminat on of the proper drug do g s diff cult t s ally ons de d atisf ctory if ta ding dia tol p ss r of 100 mm Hg or le s ar a h ved Since the ffe tiv n of the drug cannot be det rmined by asual blood pr sur adings in the physi ian s off e thr methods have been used to d t rmine ff tive do age (1) Hom blood p ssure r di gs by eithe the pat ent or a pon ble m mbe of the fam ly are re orded and h wn to the phys ian at his regul r vi its On th ba is of thes e rding th phy ic an may incr s o decrease th dos Th patient is instru ted to de rease the do e wh ne er the blood p ssur fall bel w 150/90 and not to take a dos if the blood p ssur is below 130/80 n the recumbent pos tion (2) Motionl ss sta di g f r one minut p io to a dos is ad o at d to p ev nt e e e hypote sion If an individual an stand motionle s for on minute p ior to a dose his blood p s will be suff ciently high so that an additional do e f the drug can be take Thi only guard again t ex c sive dosag and does ot indi at when the do e has be n inad q te (3) P riodi hospitalization for a day o two to d te mine ba al blood p s dings Th e e dings s ofte 50 to 100 mm Hg l ss than casual adings ob-tain d in th docto s offi e and can be us d to control th do g of the m thonium mpounds

Th initial do of the ganglionic blo k g ompounds orally i s f llow

a H xam thonium 125 mg (2 gr)

b P tolinium Tartrate N N D (Ansolys n[®]) 10 20 mg (1/6 1/3 gr)

In most severe cases ganglionic blocking agents should be con sidered but in some instances of less severe disease it will be worthwhile to begin wit rauwolfia and then either add another drug or change to a mo e potent drug if rauwolfia is not ffect ve

A Rauwolfia Drugs Rauwolf a has a relativ ly slight hypotensive action but may be useful b cause of its mild sedat ve effect and its value as an adjunct when combined with methonium com pounds veratrum or hydralazine (Apresoline®) Although t is the least toxic of the hypotensive drugs nasal tuffiness may be an oying Gastric hyperacidity may occur with larger doses Sod um retention or severe depression may oc ur in whi h case the drug should be withdrawn Dosage
1 Reserpine N N D (Reserpoid® Serpasil®) 0 1 to 0 25 mg (1/600 1/250 gr) t i d or lly at onset Maintenanc therapy 0 25 0 50 mg /day
2 Rauwolf a N N D (Raudixin®) (Rauwolfia serpentina whole root) 100 to 200 mg (1 1/2 3 gr) daily

B Veratrum Compounds These compounds have not rece ved universal favor beca se of the narrow margin between their therapeutic and toxic effects nausea vomiting and weakness More recently purif ed preparation particularly Protovera trines A and B N N D ha e been found u ef l especially in hypertensive emerg nc es In these situations (h art fail re complicating acut nephritis the convulsions of eclamps a hypertensive pulmon ry edema) giv protoveratr nes as follows
1 *Acute hypertension*
a I V 1 5 1 9 mcg /Kg Th e hypotensive effect lasts 1 to 3 hours
b I M 1 2 mcg /Kg e ery 8 ho rs
2 Ch o ic hypertens on 0 4 1 5 mg (1/150 1/40 gr) or lly t i d o q i d after meals (a erage do e) The dose must be carefully egulated at times a difference as slight s 0 5 mg m y make the diff r n e between udden vomit ng or the absen e of toxic symptoms

C *Hydralazine Hydrochloride N N D (Apresolin ®) The init al do ge of this d g is 25 mg (3/8 gr) orally t i d* prog es ive ly incre sing to a total do age of 300 mg (5 gr) a d y The sults of the oral u e of this drug as a sole method of the apy are often not impres ive but some patients obtai a hypote sive eff ct Because Apresoline® is the only hypotensive agent which *increases* the renal blood flow it may be us ful as an adj n t to oral methonium c mpounds (gangl onic blocki g agents)

Toxic sid effects are common The most important are *headache and palpitations with tachy ardia A syndrome resem*bling diffuse collagen d se se has occurred usually after la ge doses have been used f r many months

D Ganglioni Blocking Ag nts The most frequ ntly used of th se agents are Pent linium Ta trat N N D (Ansolyse ®) Chlor isondamine Chloride N N D (Ecolid®) and M camyl mine Hydrochloride N N D (*Inversine®*) They can be us d orally subcutaneous y or intrav no sly At th pres nt time with the exception of *In ersine®* the oral route has the disadvantage of small and irregular *absorption from th g stroint stinal tract* wi h resultant unpredictable falls in blood pressu e

a Acut hypotensi e r ctions ar man f sted by f intness we kn ss nd ausea and v mit ng The patient hould be inst ct d to l down imm diat ly wh th e occur and pla e his feet higher than his h d Unles th hypo te sive eff t is too seve e the symptoms pa off rapid ly with this p stu l as istance If the sympt ms pe s st giv a va opre sor d g uch s Phenylephri e Hyd o chlo id U S P (Neo Synephrine®) or M thoxamin Hyd ochl id U S P (V soxyl®) subcut eo sly a low c ntin s t av ous infus on of Leva ter ol Bitart at U S P (Levophed®) 4 mg /lite (ee page 419)

b A ute or p ogressive r nal fail re d e to decr s d en l bl od flow or f ltrat on p essu e m y eq ire di co tinu a e of th drug

c V ula th ombose a e a h d in older pati ts who suffe s e hypoten i e falls

d A low s di m diet potentiate the a tion of methonium compound and if an individ al e eiv ng f x d doses of th d g i gi n a l w s dium diet hypotens e symp toms m y o cu It i usu lly d sirable to pla e the pa tient on a 1 5 Gm (22 g) sodium di t at the o et of th spy

e Al ohol h t climate vasodilat d ug vig o ex is and salt d pletion pot nti t th act on of methonium compound

f Pa asympatheti eff ts (due t par sympathetic block ing) Bl r g of vision constipati s d dryness of th mouth an be r cted in pa t by th se of n ostigmine o ally in do s of 7 5 to 15 mg ($^1/_8$ $^1/_4$ g)

S gical P o d s

A Symp th ctomy The th ap tic v l f symp thectomy has b h ghly t ov rs al alth gh m t a thorities g ee that it pr lo gs life whe d rtak n on pati ts w th rly malig n t hype t n ion wh r al fun t s good

B Ad e le tomy Th es lts f thi d l p oc d hav ot b e mp e ve ltho gh me p ti t w th s ve hyp t n si h re iv d o de able b ef t

L w od m D t

A igid low odium diet o t ini g 350 mg (5$^3/_4$ gr) of od um r le p day ffe t v s m s but the diet igo o d m y p tient f nd t d ff ult to c t t fo th m th and y qui d It wo ld m t be indi t d only m de t f m of hyp t s o i whi h drug therapy is t t b ed The diet hould al o be u ed an adj t to th f the hyp t ns v d ug Fo d ta l f the l w odium diet p g 55

Psy h the py

C de bl evid n s ail bl to i di te that th hyp t n si p tie t oft h emot al onflict pa t l ly of the so t relat d to p ns of h st l ty nd f dep d n e and ind p nd Em tio al dist ba ult g f om th xi t f th hype te ion t lf mu t sl be nsid ed S h d turb e

c Chlorisondamine Chloride N N D (Ecolid®) 10 20 mg ($^{1}/_{6}$ $^{1}/_{3}$ gr)

d Mecamylamine Hydrochlorid N N D (Inversine®) 1 2 5 mg ($^{1}/_{60}$ $^{1}/_{24}$ gr)

3 Parenteral ganglionic blocking agents

a H xamethonium ion The initial dose is usually 2 5 5 mg ($^{1}/_{24}$ $^{1}/_{12}$ gr) of the ion given subcutaneously If no un toward effect occurs the dos can be repeated in 12 hours On the s cond dav 5 mg ($^{1}/_{12}$ gr) may be given twic at 12 hour intervals and the dose gradually increased On discharge from the hospital in 2 to 3 weeks the average patient receives about 75 mg (1$^{1}/_{4}$ gr) twice daily In some patients it may be necessary to give the drug 3 times a day but the increase in dosage should always be m de gradually (2 5 5 mg or $^{1}/_{24}$ $^{1}/_{12}$ gr /dose) and the patie t observed for several days after each increment before go ing on to the next level Caution should be ex r is d n older patie ts to avoid lower ng the pressure too rapidly this is t ue also of thos patients with evide ce of athero mata in the cerebral or coronary arter es sl c acute hypotension may r sult n thrombosis of these ves els

b Pentolin um Tartrate N N D (Ans lysen®) The nitial dose is 1 2 mg ($^{1}/_{60}$ $^{1}/_{30}$ gr) of the s lt given subcutane ously If no untoward effect occurs the dose an be gradually increased beg nning on the second day by in crements of 0 5 mg ($^{1}/_{120}$ gr) On discharge from the hospital th average patient recei es 5 to 10 mg ($^{1}/_{12}$ $^{1}/_{6}$ g) per day in divided doses The ame preca t ons noted for *hexametho i m* are to be obse ved

Following discharge the pat ent hould be s n at fre quent inter als and the dose adjust d so as to chieve the desired effect without undue faintn ss o aide eff cts In some patients in order to p event a postural hypotension which may produce s vere symptoms d i g this period it may b n cessary to have the pati nt li down for one ho r after each injectio I many of these patients howev r tolerance gradually develops although marked hypotension may still o cur on standing the patient may be able to s t or walk immediately after an injecti n Patie ts should be warned to avoid motionles stand ng fo an hour or o after an inject on shaving wait ng in line fo a bus and similar activitie should be part cul rly condemned

4 Acute hypertens ve emergen ies Give hexamethon um in travenou ly at a rate of approxim tely 1 mg ($^{1}/_{60}$ gr) per minute to a total dos of 10 t 20 mg ($^{1}/_{6}$ $^{1}/_{3}$ gr) depending upon the respon e of the pati nt o ese pine 2 5 mg every 3 hours The most impo tant of th emergency situati ns tre ted in this way is a t pulmona y ed ma associated with a marked r se in blood pr ss oc u ring n hyp rt sive pat ents with left ventricular fa lur Pulmonary edema m y impro e dramat cally und r th s circumstance G eat caution m st be used to gi e th d ug lowly and to di c tinue administration when a mode ate fall in p ss r has been achieved A further f ll in blood press e m y oc u for a time after the drug is withd aw

5 Side effects and hazards of g ngl i ag nts

ANGINAL SYNDROME
(A gina Pecto is) (code No 401)

Th di gno is f angina pecto is must b ba ed pon po iti di gnosti criteria not a iv d at by xcl sion The d gnosis d pends upon proper int rpr tat on of a c eful h st ry and a accurate evaluation of th c edibility of the pati nt

Diagn s s

The a di l ymptom of the angi al synd om is pain ind ced by anything that in ea es the wo k of the he rt (e g ex tion, ex itement c ld heavy meals) Pain is u ually s bsternal b t may be pre ordial The ons t is udden but n t in tantan us its char ter s th t f pr ss e o a q e l g s sation of significa t b t hort duratio ra ely lasti g more tha 15 or 20 min tes

T eatm nt of th Acut Atta k

A Spe if M e (Nit it)

1 Gly ryl Trinitrat U S P B P (nit oglyce in) is the drug of hoice It cts in about 1 2 min tes A soon a th attack beg s pla e o e 0 3 mg (1/200 g) t bl t under th to gue a d allow it t di solve The d s may b inc eas d to 0 4 0 6 mg (1/150 1/100 gr) if no r li f is obtained from a small d Nit gly eri e may be ed fr ely wh ev r an ttack oc urs or m y be s d i ord r to p event an att ck It m y u e he dache nd hypot nsion

2 Amyl N t it U S P B P 1 p 1 cr sh d and inhaled act in bo t 10 se o ds This drug usually ca s di g ee able id rea tions of fl shing of the f ce pounding of the pul e a d om time di ziness and h ads he The e r tio s may be mi imi d by inhaling the drug f om a dis t nc o by p dly p ing the c ushed pea l befo e the nos Th p ti t oon le rns how to vary the amount of d ug h w shes to inhale

3 L ng r t g nitrite a d th dr gs have no plac in th the py of the ac t att ck

4 Al oh l 30 60 c (1 2 z) of whi ky brandy et m y be a helpful h m r m dy

B G r l M es R st is the m st import nt th apy in an tta k The p t e t should c s any ertion and should stand still it r lie down on s he det ts th on et of pai and until the tt ck is ov This g erally is th natural re tion of m st pati ts b t some try to work th attack off Patie ts hould b w rn d ga nst th s

P v ntio of F th Att ks

A Sp ifi M a u

1 D ug

L nger acti g nit ite P t e ythrit l Tetranitrate N N D (P rit te®) ms to be th mo t eff ti of th e Th rag d s i 10 mg (1/6 g) t i d c

b Gly e yl T init at U S P B P (itrogly ine) 0 3 0 6 mg (1/200 1/100 gr) u d r th tongu ju t bef re a tivity

Xanthin Th s drug may be of ome b nefit o lly in l ge d s (e page 204)

aggravate the degree of existing hypertension and increase th load on the heart and kidney Attempts have been made to treat hyper tensive patients with psychoanalytic methods b t the ffect on the blood pressure has been poor even though symptoms may ofte be improved Reversal of hyperten ion followi g psychotherapy has been extremely rare Attention to the emotional needs of the patient is an important adjunct to other methods of treatment b t should not be the sole method of treatment except in the mild benign forms of the disease in which drug or surgical therapy is not indicated

Other Method of T atm nt

A Sedation Nervous tension is frequently found in the hyper tens ve patient and may aggravate his illness In many ca es sedation either used alone or as an adjunct to other forms of medical therapy will be of decided be efit Phe obarbital is the drug most commonly used Dosage 15 30 mg (1/4 1/2 gr) t i d to q i d

B Drugs which have evoked little general enthusiasm despite occa sional favorable results because of the unpredictable effects o *the hypertension and the high in dence of unpleasant aid ef* fects include Dibenamine® the di hydrogenated ergot prep ra tions Tola oline Hydro hloride U S P (Priscoline®) and potassium thiocyanate and the long acting nitrites

Treatment of Complications

The cardiac erebral and renal complic tions of hypert ns o are discussed under congestive failure (see page 181) angina pec toris and myoc rdial infarction (see p ge 163) ce ebral hemor hage and thrombos s (see page 349) and ren l failu e (see page 301)

Head he

The headache of hyperten ion is l gely on an motional b sis Sugge tio and explanation are often helpful Hypotens ve dr gs are most eff ctive in lieving eve e head he associated with the malignant or pre mal gnant phas of hyperte sion

CORONARY HEART DISEASE

Co onary I suffi iency

Co ona y insuffi ncy is a dynamic concept which is co e ed with the balance betw en the blood flow in the coron ry a terie and the d mands of the my cardium for blood It exists wh never the requirement of the myocardium fo oxygenated blood exceeds the flow of blood of the myo a dium at any nsta t

Coronary ins ffici ncy may be acute and transient in whi h case it is c ll d a gina pector s it m y be a te protracted and associated w th myocardial infarction o it may be subac te mod *era ely protracted* and without myocardial n crosis b t clinically recogn zabl The latter form has be n alled coronary failure by Blumgart and hi asso iates a d is thought to represent occlusion of a relat vely minor *cororary artery* with sufficient collat r l ci cu lation to pre ent myocardial n crosis T atm nt is milar to that *of a mild infarction*

Di gnos
I typ al ca th inf rction i chara t r z d by s vere p o-long d cardia pain im la in location and diat on to that of angina pect is it oft n a sociated with hock ongest ve failure and ar hythm a D l y d m tf stations in lud fe er l ukocy to l a d el ted s d m t t on rat Ecg abnormalit s e typ cal with h act i t ha g s in Q T and ST segm nts wh h m y be d lay d V iat ons f om th typi l patt n ar t uncommo Cha ges i the serum t amj l v is ex di g 40 ts/ may be p e t fo the f t fo days Ser al dete minatio s w th a ap d ri e d f ll in o ce t t on quit helpful

T tm t
A Imm d t T atm t
1 R st - Phys al and mental rest in the mo t comfortable po iti n is s ti l during the f t 2 3 week du ing whi h t me pt r of the h art is m st apt to occur Th pat t should ot be allow d to f d or f r hims lf d ring th fir t few days l s the atta k is m ld w thout shock or th compl catio s Sp ci l nu si g c is highly de s rabl A beds d commode s ow consider d to equi l ss ff t than the of a bedpan (unless th p tie t an th latt comf rtably)
2 R l ef f pa
a M ph ne Sulf t U S P B P 10 15 mg (1/6 1/4 g) lowly I V (unl p tient un ons i us) If the pain ot lie d in 15 minut pe t this dosage Aft r th ti l li f of pain f th inj cti s of morphine can b g v s b ut 8 15 mg (1/8 1/4 gr) ne ss ry f eli f f p in The bcuta eo ro t used unl th tt k s o th p ti t in hock If th pat ent is n h k with v pain the low intr v nou us of mo phin may b c ry be ause of th poo ab orp t of the d ug wh n admini te d sub utaneo ly
CAUTIO Do not give a se ond d e of morphine if res ratio are below 12 per minute
D merol® and Dilaudid® (b l w) re pr fe ed to mo phine by s m clinicians in th t e tm nt of nfar t on th y a e d to p oduc l s ea and vomiti g
b Dihyd omorphino Hydrochl ride U S P (Dilaudid®) 4 mg (1/18 g) I M o I V may b u d inst d of morphi e
c M pe idine Hydro hl rid U S P , P thidine Hyd o-hlo id B P (Demer l®) 50-100 mg I V r I M as n d d
d Ami ophyll e U S P B P 0 5 Gm (7 1/2 g) I V y l ly (1 2 c pe min t) may be h lpful if th p in i ot li d by opi t and/ r oxyg n (e bel w)
3 Oxygen is oft n u ful d m tim s e ary f th l f f dysp e y o s pulmon ry d ma shock and ch t p in G e by BLB OEM o Benn tt mask al ph yng l th t as l m tal inh l o oxyg n t t (pag 145)
4 Rea nc Attempt to ll y app h n and anxi ty
5 Sh k f qu t and iou compl atio with an sti m t d m t lity of 80% p ticularly i tho e i whom hock

2. Abdominal support Obese patients with protuberant abdo mens w o have angina may have fewer attacks following the use of proper abdominal support the mechanism is not clear The Kerr Lagen b lt is designed for this purpose
3. Surgical procedures These have been employed only in patients with severe incapa i.ating angina pectoris in whom m dical treatment has failed the results to date have been inconclusive Stud es now under way on the ligation of the internal mammary arteries have yet to be evaluated
4. Production of myxedema by means of thiourac l compounds or radio active iodine (I^{131})(see p g 372) Th objective is to reduce the work of the heart Good results ha e been report d in about half of the cases of intractable angina but this method should not be us d until prolonged rest and attention to the emotional needs of the patient have ruled o t a transient reversible coronary insuffic ency

B Gen al Measu es
1. The patient must avoid all habits and a tivities that he knows will bring on an attack
2. Treatment of oexisting di orders esp ially anemi which may lead to increased ca diac ischemia
3. Rest Most patients with angina do not requir prolonged bed rest but rest and relaxat.on are ben f cial Adequate mental rest is also importa t
4. D et Obese pat ents should be placed on a reducing low animal fat diet and their we ght br ught to normal or slightly subnormal levels
5. Tobacco is best a oided or used in moderat on be ause it produce tachyc rdia and elevation in blood pressure
6. Hyper hol sterol mia has b en sh w to ac ele at ath ro scl rosis in man and to be esse tial n its product on n animals If the serum cholesterol exc eds 260 mg % n a patient with angina pector s an attempt should be mad to lower it by di t with total calories ontain ng about 25% fat (60% vegetable and 40% animal) If thi s unsu saful beta sitosterol (Cytell n®) may b added 1 or 2 Tb p im mediat ly before ea h meal It has not be n shown however that lowering the serum h lest rol level will r v se the atherosclerot c p ocess

ACUTE MYOCARDIAL INFARCTION (code No 430 516 7)

Myocardial infarct on is due to ne ros s of a portion of the card a muscle as a result of imp irment of ts blood supply This impairment usually results from occlu ion o thromb sis of a coronary a tery but it may result from mp ired blood flow a a result of shock or acute anem a from any cau e Myocardial nf rction varies quantitat v ly from histolog c ne is to massi e nf rction All inte mediate degr es occ r and esult in v ried cl nical fe tur : The infarction may be ess nt ally asympt mati

The ons t of a gina pectoris may be a oc ted with oronary occlusion even though infarctio does not occ r (if th ollat l blood flow is adequate) The prognosis is better than pre io sly thought

fail e o urs digitalize w th are (e page 197)

3 Stokes Ad m atta k with he rt block is an em rgency (s pag 180)
4 Thrombo-embol phe omena a e mm d ing the co rse of my rdi l infa ct on If anticoagula t have not be n giv n th y should be p omptly administ d (ee p ge 215)
5 Ext nsion f th infar tio When r r t p n o urs d ys o w ks afte th initial p in ha s b ided extensi of th myoca dial ecr is should be suspe ted a d conf r m tio ought in the el t oc d og am and in other clinical f tur Th sam m thod of t tm t apply s to the or g nal f rct on b t a f th p r od of st is eq i ed

A tivity Stat in Con al cen e

Th m m m p d of t sho ld b t l ast 3 w ks f th far t o has be n v y s v r this hould b c as d to app o mat ly 6 w eks The p gram fo mo t pat e t is 1 mo th of complet est 1 mo th of lowly in as g t ty and a thi d m nth f rest ict d act ity prio t tu g to wo k The amo t of st sh uld be ind vidu li d ac o d g to th v ty of th myo card al nfa t o d th r po of the p ti t

Th pat t should t b p mitt d to walk f ly bout th oom f r ab t 7 10 days after h fi t all wed o t f b d G ad al s mpt o of a tivity is mo t imp tant He sh uld r mai o th am flo w th grad lly in reas g period of w lking slowly and w th t p od ing hest pa dy pn a u d t hy a d a fatigu Wh t t llowed o t of doo ually ot u t t 2 mo th aft the farct on h sh ld avo d hills d ta s f anoth m th

CHRONIC RHEUMATIC HEART DISEASE

Rh umat h t di s is one ph s i th h mat f er ycl Th stag of ymptomat c alvul r h t dis a e with t dia fail e is the l te t peri d b tw n th ub id of acut h umat fev nd th t minal phas of ca di f ilu e Th physi n e deavo to p ol g thi late t ph s s m ch s po sible

Man g m t f A ymptomatı Valvula H rt D ea

A P ophylax

1 P v t of ur en of a ut h mati f er
   a A o d exp ur to t eptoco al nfe t ons
   b C ti uo s tibi t p ophylaxis n sel cted cas
   c P mpt and adeq te t eatme t of h molytic t pto- o us inf tio
2 P ophyl ti dvi e i g d to d tal tr tio u logi p ed es gi al pro edures et t pr vent bact mi and p ss bl b ut ba te l e doca ditı

B G l M s e

1 P p vo at o al guida to ant ipat a lat period wh n i e t le an m y b s gnifi antly limit d
2 Ea ly ec gnitio of d st ban s of thy oid funct an mia p oxy mal a rhythmia et o to p ovid p ope therapy
3 M int na of g e t h lth w th good h bits d qu t d t a nsta t l v l of ti ty d d q t sle p
4 A idan of be ity d ce iv phys l e t

is delayed and appears afte the pain has subsided

a. Vasopressor drugs Prese t evide ce suggests that vasopressor drugs (sympatheti amines) may ele ate the blood pressure and decrease mortality in myocardial infarction associat d with sho k Shock must be t eated early to achieve the best result For details of th use of v sopressor drugs see pag 30

b. Digitalis A hypotonic myocardium often accompanies acute myocardial infa ction a d shock may be a sociated with an increased ve ou pressu e Some in estigators now favor digital z tion i th sho k of acut myocardial infarction D gitaliz tio can be accomplish d as in congestive heart fail The i cr ased card ac o tp t i cr ases c onary flow and the p e r m y ris

c. Treatment of cardiac arrhythmias Sho k may b the result of undetected e t icular tachy ardia or oth ar hythmia and p ompt t eatment of th c mpl cat on (s b l v u d cardiac ar hythm s) may be life sa ing

d. V n and a te al transfusions Thes have not been very eff ct ve but should be k pt n mind as adjuncts

6. Anticoagulant th rapy This s a cont o rsial matter in the milder as s (rapid el f of pain min mal s gn of myo a dial necr sis ab en e of sl ock or d ac failu e) In s vere c s of myocardi l infa tion anti oagulants are ge e ally ec mme d d Fo t chnic se pag 215

7. Sedation Adequ te sl ep is as tal in p ti nts with myo c rdial i f ti n a it s with tho suff ring from c diac failu e Sedati e should be u d as nec ssary to p ovid suffi ent le p and morphine d r v t ve hould ot b with ld n the f st few day f th y a e indic ted

B. Follow p Car ful cl ni al ob rv t on s m nd t ry t d te m n th pat ent p ogre s On sh uld be ale t for evidence of extension of the infarct on n w inf r tion the app aran of compl c ti n or symptoms req iring treatment

C. T atment of Compli at ons

1. Cardiac fail r If c rd f lur de elops treat as fo fa lure f om any c u Oxyg low sodium ntak me rial di r t cs a d ca ti d g t lizat n are th ssent als The p tie t sho ld be dig tal d in such a m nn as to a vo d toxic r a tion If poss ble Rapid digitali at n s b t avo ded unless th fail i urge t If th ardia fa lu e i m ld a d manifested solely by pulmon y ale nd in c eased dy pn a restri t on f sodi m nd the adm n stration of mercurial diur tics m y be suff cie t D gitali i av ided by s me utho it be au e f the ha d of ven tr cula a rhythmi s but its well ntrolled dministrat h uld not b d fer d if cardiac f il re dem nd t

2. A rhythm as

a. Vent cular p matu e be ts These a ommon and i d cat increa d i r tabil ty of the d mag d myoca dium a d may pr s g v ntri ula tachy rd a Quinidine u fate i the drug f choi e (se pag 200) An alternative to quinidin is pro ainam d (se page 205)

b. Vent icular tachycardia is n eme g ncy (see p g 178)

c. Atrial f brillati n is u ually transient If this p ist if the patient tole ates it poorly o if cong tiv h a t

diagn is of mitral sten sis is difficult und r thes cir um stanc a d th surgi al m tal ty high

AORTIC STENOSIS (code No 499)

Operat e reli f f m han l a t c te o s ha be n s cessfully h ev d in c t yea

Di gno s

A H rt F ding Th cr te ia fo cl nic l diagn is of a rtic st n s a e und g ing som r visi b t th lass s gns re (1) l d gh ort sy tolic murmu and thrill e ding bef e th se o d sound and t ansmitted to th neck and apex ( ) a h ving pical mp ls typ l of left ent cula hypert o phy (3) a mall su t in d anac t p lse and (4) a we k A_2

B Oth symptom and Signs Th les on may b a ymptomatic or oc ted w th dy pne p ogr sing to rdia f lure ync p and/ a gina p cto i

S gical Tre tm nt

The ind ti fo gi al r ction of ao tic teno s a e pr gres e l ft v ntricula failu tta ks of syn op d e to c e bral is h mi a d angina pe t ri wh n th ght to b d to the de cr s d ardi c o tp t f o tic st no i and not to a ciated co o nary dis s In th p f both mit al d aort st o is u gi al ection of both valv an b performed at th am op t on

BACTERIAL ENDOCARDITIS

(Suba ute code No 450-100 0) (A ute code No 450-100)

Thes are infe tions o ur g o the l teri s fa s of the he t (most f eq tly the val e) r gr at v s el a oc ated with how r f l g d mall myc ti mbol Th m t mm in f ting gan ms e St pt o vir dans a d St eptoc us f ecalı which th l ı l s bac t b ter l endoca ditı Ba te mi s wh h may a mpany p mary inf tio s h a pn umonia may ca e ut bact ial ndocardit du t p mo- o i st phyloco ci beta h molyt c st eptoco i H mophilu infl en e a d gon c i

Di gnos

Sympt ms are ally tho e of pt emi th s gns in l de f pallo pet hial h mo h g s ple m galy l bbing of fing and vid of l ul congen tal h art dis Do t mak di gn is of subac te b ct ri l e doca dit s in th ab s of valvul o co ge tal he rt di r without peated po iti blood ult s howing the ame o gani ms Do n t xclud th di gnosis of b terial d a diti with t repeat d neg tiv bl od ult m ow cultur s Oc asional typical clini al s s will be found to h pe tedly gati blood ultu e Unde s h co dit the apy m st be sta t d emp ri ally t p t e i s dam g to h art val

MITRAL VALVULAR DISEASE

This is the most common of valvular lesions It takes from 3 to 5 years for mitral stenosis to develop mitral insuff ci ncy may occ r alone or more commonly in combination with mitral stenosis

MITRAL STENOSIS (code No 498)

In view of the excellent r s lts obtained f llowing mitral valvulotomy the signs of mitral sten sis should be clearly appreciated

Diagno is

A S gns of Uncomplicated M tral St nosis *The most impo ta t of* these ar (1) a mid diastoli long m rmu always associated with presy tolic ac entuation if th re i sinu h thm and s ally associated with a thrill (2) a s appi g fi st s und and an opening snap and (3) an abse t sy tolic murmur at the apex or one which is short and Gr de II or less

If pulmonary hypertension is present its s gns a d those of associated *right* ventricula hyp trophy may be demonst ated

B Exclus on of Mitral Insuff cien y Mitral inc mpetence must be xcluded if possible The mitr l valve is operable *only if* the patient a condition is due to a mechanical obstruction of the mitral valve If there is o systolic mu mur in the presence of the signs of mitral stenosis mitral incomp t nce is e c edingly unlikely If there is a loud pan systolic murmu at the apex in association with an acc nt ated often early 3rd heart sound a oft 1st sou d and no opening snap the diagnos s of predominant mitral inc mpet nce *is lik ly* ev n if a short mid di stolic murm r can be he rd at the apex Left ventr cul r hype tr phy in the Ecg should mak o e v ry autious in ecomm *nding* surgery for mitral stenosis beca se of the likelihood of ignificant mitral incompetence unless hypertension or an o ti valvular les on is present If the e i a moderate systoli murmur at the apex the diagnosis must rest on a consideration of the total findings

Surgical Tre tme t

The ours of mitral st nosis is highly variable and in iew of th mortality of mitral valvulotomy (3 5%) surgery is not advised in m ld cas s with slight exert o l dyspnea nd fat gue only Indications for surg ry include the following

1 Signs of mitral st nosis with a pliabl valve (*opening s ap snapping* 1st s und)
2 Uncontrollable pulmonary edema
3 Disabling dysp ea and occ si nal pulmonary edema
4 Evid nce of active pulmona y hypertension with ght en tricular hypertrophy and *early* cong stive failure
5 Systemic and pulm nary emboli
6 Incr a ed pulmonary arteriolar re ist nce w th *marked* dyspn a and increas d P_2 The e pati nts are apt to d lop right heart fail re a d emboli
7 Right heart failur with atrial fibrillatio tri uspid in om petence when secondary to marked mitral st no i *The*

Approximate Dosage Schedules

Pen illin Inh b tion (Ba teri idal at 72 H s) (Unit p r cc)	Total Pe illin Do g per 24 Hrs (Millions of Un t)
<0 1	1 2 (p nic llin p ocai)
0 1 0 5	3 4 (aqu e)
0 5 0 9	4 5 (aqu o s)
1 0 5 0	6 20 (aqu oue)
> 5 0	20 500 (q eo)

When bact remia d feve per st the do g ho ld be doubl d and redoubl d until f bl respons occurs Alte at vely syn g stic t tm t w th 2 o mo e t biot may b ed Wh n high co ent tio of pen illin a e r q ir d P ben id N N D (B mid®) 0 5 Gm (7½ gr) ev y 6 hours may be u ed t inhubit r nal x cr t o

2 St eptomyc n S lf te U S P Int mitt t I M inje tion s the m thod of ch and gives s good lev l s thos ob tain d by I V injecti ns La ge d ses ar advi ed 0 5 1 0 Gm d olv d in 4 c (1 d) di till d water + 1 2% proc i e I M ev ry 6 hour hould be given Obs rve fo toxi ty

3 C mbi d pemcillin and str ptomyc n Preliminary eviden e ugg ts th t peni illin (5 milli n un ts/day) + t pt my in (2 Gm /day) may be the optimal tr tm nt fo infections d e to St ept c us fa l and al o f th hort (2 we ks) t tm nt of doc rditis due to s s ti e t ai of Str pto occus v r da

4 Chl t t acy lin Hydrochlo d U S P (Aur omycin®) Oxyt t a ycline U S P (Terr my in®) T t ycline U S P (Achromycin®) Chl ramph ni ol U S P (Chloro my etin®) and Erythromycin U S P (Erythrocin®) Whil th se drugs may s ppr s the p og ss of sub cute bacte i l endo rditis th ir use i f q ntly f llow d by relap e Wher ver pos bl d gs exh biting mo e pron unc d ba te ri idal acti ity e g pe cillin and tr ptomycin sh uld be the fi st ho e in t tm nt Th exact dos g and eff c ti es of th apy hav ot be n est bl h d Naus a and omiting esult f eq ently fr m th oral adm ni tration of hlort t ycline and may inte fer with tr atm t In s h cases th drug must be gi n I V in do e of 50 100 mg or mo e v ry 6 ho s

Although Str pto us f cali ge rally inhibit d by hlortetra y line xyt tracy line and tet acy lin tr t m t with th drugs of doc ditis d e to this rgani m is g ally in ff tiv

5 Other dr g Neomy in Sulf te U S P (My if din®) B it cin U S P and Polymyxin B Sulfate U S P (A rospo in®) may b us d al o in combinat o w th other drug wh re th o ga sm is inse it ve to l s t xic anti biotics (s page 514)

Treatment

A. Specific Measures: The most important consideration in the treatment of bacterial endocarditis is a bactericidal concentration of one or more antibiotics in contact with the infecting organisms which are often localized in avascular relatively inaccessible foci. Penicillin, because of its high degree of bactericidal activity against the great majority of bacteria which produce bacterial endocarditis and because of its low incidence of side reactions, is by far the most useful drug. Synergistic combinations of penicillin with other antibiotics have often proved valuable. Few cases have been cured by bacteriostatic drugs such as chlortetracycline (Aureomycin®), *oxytetracycline (Terramycin®)*, tetracycline (*Achromycin®*), chloramphenicol (Chloromycetin®), and erythromycin (Erythrocin®) used alone. Positive blood cultures are invaluable to confirm the diagnosis and to guide treatment and should be combined with tests of sensitivity of the infecting organism to various antibiotics or combinations of antibiotics. Hence one or more blood cultures should be obtained daily for 3 to 5 days before instituting treatment, except in desperately ill patients or patients with acute bacterial endocarditis. To avoid further heart damage, treatment should not be further delayed.

1. Penicillin: This drug must be given parenterally in bacterial endocarditis in order to gain effective levels. The dose of penicillin used depends on the sensitivity of the organism, and this is determined by doing in vitro sensitivity tests. About 90% of strains of Streptococcus viridans from cases of subacute bacterial endocarditis have been found to be inhibited in vitro by 0.1 unit of penicillin per cc. or less. However, some are quite resistant, requiring up to 10 units or more.

   A minimum serum concentration many times greater than the apparent in vitro sensitivity of the organism must be produced to insure a bactericidal concentration in the vegetation. In patients in whom positive blood cultures are not obtained or where sensitivity tests are not available, 5 to 10 million units of penicillin should be given daily. There are three alternative methods of administration:

   a. Procaine penicillin: For organisms sensitive to less than 0.1 U. per ml. of penicillin, give 500,000 to 1,000,000 units of penicillin procaine I.M. twice daily.
   b. Intermittent administration: For organisms sensitive to 0.1 U. per ml. of penicillin or more, intermittent intramuscular injections of aqueous penicillin solution every 3 to 6 hours.
   c. Continuous parenteral administration: If the total daily dose is approximately 5 million or more units of penicillin per day, administration is usually best accomplished by a continuous intramuscular drip (or occasionally intravenous drip). The antibiotic can be dissolved in 1000 to 2000 cc. of physiological saline solution or glucose solution.

Approximate Dosag Schedules

Peni illin Inh b tion (Ba tericidal at 72 H) (Unit p r c)	Total P nic llin Dosag p r 24 Hr (Millio of Units)
< 0 1	1 2 (peni illin p oca e)
0 1 0 5	3 4 (que s)
0 5 0 9	4 5 (aq eous)
1 0 5 0	6 20 (aq eo s)
> 5 0	20 500 (aq ous)

When b ct emia a *d f ver p s st th* dos g sho ld be do bled a d ed bl d until f vo able pon o s *Altern tively* syn rgist c tr tm nt w th 2 o mor ant bi tics may be u ed Wh high onc t at s *f pen* illin e quir d Pr ben d N N D (B n m d®) 0 5 Gm (7½ g) ev ry 6 h s m y b *s d to inhib t* nal ex c tion

Streptomycin *S lf te U S P* Inte m ttent I M inje tion i th method of cho e and gives a good l vels a tho *e ob t n* d by *I V* jecti s Larg doses a e advis d 0 5 1 0 Gm di ol d in 4 cc (1 dr) distilled *w t r + l c* 2% p ocai e I M ev ry 6 hours ho ld be giv n Ob erv fo toxi ity

3 Combi ed penicillin a d st ptomy i Pr limin y evide e s ggest *th t p n illin* (5 million unit /day) + st ptomycin (2 Gm /day) may be the optimal treatment for *infecti s due* to St epto c us fa l and also for the short (2 w ks) t eatm nt of endoc rditis due to *s n itiv strai s* f St eptocus idans

4 Chlort t a yclin *Hydrochlor de U S P* (A reomy in®) Oxytetracycline U S P (T ramyc n®) Tetr ycline U S P (A h myc ®) Chl mphen ol U S P (Chlo o myceti ®) d Eryth omy in U S P (Eryth *ocin*®) *While* th s drug m y a ppr s the p ogr of sub ut bact ri l ndoc diti th ir u e i f q *ently follow* d by el p e Whe ev r p ible d gs xhibiting m p onoun ed b cte icidal activity *e g* peni llin and st pt my in, hould be th fir t ch i e in tr atm t Th xa t dos ges and effec *tiven s of th* rapy have ot be n establ shed Na and omiting r ult f equently fr m th oral *administ* ti n of hlortet a yclin and may inte f with t eatme t In uch ase th dr g must be giv n I V in do es of 50 100 mg or mor ev ry 6 ho s

Altho gh Str *ptococcus f* cal is gen rally inhibited by chlo t t acycline *oxyt* t a ycline and t tracycline t *eat* m *t with th* drug f *ndocarditi* d e to thi *organi* m i g ally ineffective

5 *Othe* drugs N omy in Sulfate U S P (My ifradi ®) Bacitra in U S P and P *lymyxin B Sulf* te *U S P* (A r sporin®) may be d alo e o in combinatio w th oth drug whe the o *ga m i in* s t t l s toxi anti biot c (s pag 514)

6 Combined therapy In infections due to *highly resistant* organisms synergistic pairs of antibiotics as determined by tests of bactericidal activity in the laboratory may be used (see page 496) Combined *therapy should never* be attempted without adequate laboratory control

7 Duration of treatment The suggested duration of therapy by various au orities is 2 8 weeks Most patients should be treated for 3 4 weeks after *sterilization of the blood stream After therapy* has been discontinued the patient should be *carefully observed for recurrence by taking repeat d blood cultures*

8 Recurrences Most recurrences are *obser ed* within a week or two of the end of therapy Occasional cases relapse months later The diagnosis of recurrence must not be made on the return of fever and embolic phen mena alone these may occur for up to 6 8 weeks after therapy has ceased Positive blood cultures are *essential for* the diagnosis of re*currence* Before re treating ag in determine the *se si tivity of the organism and th n give treatment with higher dosages for a* longer period of time or use a different anti biotic About 70 75% res *are now being reported*

9 *Anticoagu ants* It is g n rally agr d that the use of h par n or Bishydroxycoumarin U S P *(Dicumarol®)* in the treat ment of subacut ba terial endocarditis is unnecessary and may be dangerou

B Ge eral Me s res General support e measures as for any sev re infection with fever *should be given*

C *Complications and Treatment*

1 Infar t n Caused by emboli *breaking off from* the infect d area *The infar* tions usu lly o ur in organs in th sys temic cir ulation but if the endocardial les n is on the right side of the he rt the embolus may be to the pulmo nary c rculation Treatment is *symptom tic*

2 Cardiac failure (uncommon) A tive myocarditis or s ar ring of the h art valves m y *precip t te congestive fail r* Wh n giving large q ant ties of p ni illin as sod um salt *one may give significant amounts of* sodium ion Therefore when treating a case of sub cute bacterial endo arditis with congestive failure or poss bl *fail re* se alcium or pota sium p cillin (See cong sti fail re pag 181)

3 Anemia The anemi *if seve e* should be t e ted by wh le blood transfu ions (s e page 247)

4 Uremia May result fr m focal embolic nephritis or glom ulonephritis (see pag 293)

Prophylaxis

A h gh percentage of cases of endocarditis ar e after d ntal procedures or surgery of the oropharynx and genitour na y tra t Therefore all patients with valvular or congenital h rt diseas who are to have any of these proc du s should be given pen llin prophylactically A *satisfactory* sched le is a follow Pro ine Penicillin G U S P 1 000 000 units daily fo 2 days before pro cedure on the day of th proced re and for 2 d ys after th procedure

CARDIAC ARRHYTHMIAS*

Cardiac ar hythmia ar ommon in ev ry phys c n s practi nd a thoro gh knowledg of th i d agnos s and ma g me t is s ntial Cl nical manifestations vary from tr vi l p lp tatio t a clinical tat f th utm st u gen y as wh n ve t icula tachy a di ompli at ac te my cardial inf r tion

Relation of Symptom

Th ymptom p od ed by a arrhythmi d pend upon th und lying tat f th h t the ntr ula at and th d ration of the a hythmia Ev a no mal he t m y f il if th vent icul r ate s rap d eno gh o if th arrhythm a la ts l ng gh Tachy ard wh ch m y be w ll t le at d by e indiv d al may p oduce a ve ut pulmon y dema n a oth r (e g i a p tie t with tight mit l st is) Th phy ci n m t de de when t ig or when to tr at con rvat vely a d whe t x rt maxim m effort to tre t an hythmia

DISTURBANCES OF ATRIAL ORIGIN

ATRIAL PAROXYSMAL TACHYCARDIA (ode No 422)

In th di t ban e of hythm it is tho ght that an e top fo s withi the at ium t k o as the pa em k r of the he t and dis ha ges mpul s at t aryi g f om 120 to 320 pe minut u ally b twe n 170 and 210 p minut The r t i ab ol tely egul r and t ff ted by pi ation mov ment or c rotid inu pr s (unles this abol hes th atta k) At ial t chycardi usually a ben gn d s d unle s it mplicates ev e h a t dis s At le t half of th ca es cc in individuals with ut ganic hea t dise se D th duri g an att ck is r but c ebr l is h mia rdi c f il m y o cur wh n the m p d ates last o a p ri d of day The tta ks ar ft n produ d by emot o al ten ion a ommon n young individ al and at tim are rel t d to a c l r ted o d cti n th gh the A V nod f m ly kn wn a the W lff Parkins Whit syndrom R urrent atta ks e fr que t so th t th p blem f p ev ti g att ck is a imp rtant s th tr atment of the ndivid l att ck

T eatm t f the Acute Att k

I th be nc of hea t disease s ff ts a e ra e M t ttack subs de spo tan ou ly and the phy ic an hould n t u em die th t are mo d ge o s than the di ea e Pa ti ul r ffo ts hould be m d t st p the atta k q kly if it pe si ts fo s veral days if a di fail r syn ope o ngin l pain d velop o if th u de lying a di c di e

A M h i al M s A va iety of methods have be us d to i te rupt tta ks and the pati t may le r to do th e hims lf Thes i l de th Val alva ma u (h lding b eath a d n t acting ch t nd bdomin l m scl) stret hi g of the a ms nd body lowe i g th he d betwe the kn s and b th holding

*S p g 195 206 f details f d gs

B Vagal Stimulation

1 Carotid sinus pressure With the patient relaxed in the semi recumbent position firm but gentle pressure and massage should be used first over one carotid sinus for 10 to 20 seconds and then over the other Pressure should not be exerted on both carotid sinuses at the same time Continuous auscultation of the heart should be carried out so that pressure is stopped as soon as the attack ceases Carotid sinus pressure will interrupt about half of the attacks especially if the patient has been digitalized

2 Bilateral eyeball pressure has been recommended but it is rarely as effective as carotid sinus pressure and carries the risk of producing a detached retina

3 Induced vomiting (except in cases of syncop anginal pain or severe cardiac disease)

C Drug Th rapy If mech nical measures fail and the attack con tin es (particularly if the above symptoms are present) drugs should be employed There is no unanimity of opinion about the most effective drugs but the following are satisfactory

1 Quinidine Sulfate U S P B P (see page 200)
2 Neostigmine U S P (Prostigmin®) 1 mg subcutan ously
3 Digitalis orally or if no digitalis has been g ven in the preceding 2 weeks intrav nously
4 Procainamide Hydrochlo id U S P (P onestyl®) (s e page 205) Continuous electrocardiograms or continuous monitor ing of the heart rate and blood pressur e essential
5 Methacholine Chlorid U S P B P (Mecholyl®) 10 mg subcut is often effective but produces very npl asant side effects and should rarely be us d
6 Syrup of Ipe ac U S P 4 to 8 cc may be used to induce vomiting It may be r peat d if un uc essful

P evention of Attacks

A Attempt to f nd and remove the cause especially emotional stress undue fatigue or exc s ve use of alcohol or toba co

B Drugs

1 Quinidine Sulf te U S P B P 0 2 0 6 Gm (3 9 gr) t i d to q i d may be us d to prevent frequent a d trouble-some atta ks Begin with small do es and in rease if the attacks ar not prevented and toxic effe ts do not o cur
2 Should quinidine fail or if it is not tolerated full digitali a tion followed by digitalis in maintenance doses may prevent or dec ease the freq ency of attacks (see page 197)
3 Procainamide Hydrochloride U S P (Pronestyl®) in a *maintenance* dosage of 250 to 500 mg t i d may be tri d if the above methods are n t su ces ful

NODAL PAROXYSMAL TACHYCARDIA (code No 422)

This resembles atrial tachycardia exc pt that th ectopic focus is in the A V nodal ti sue At tim s th electrocardiographic or clinical distinct on between atrial and nodal p roxysmal tachyc rdia is not possible in which case the term s pra e tri ular ta hyca dia is used Treatment is carried out al ng th same lines as fo atrial tachycardia (see page 173)

ATRIAL FLUTTER
(Paroxysmal code No 423) (Chronic code No 424)

This a rhythmi is du to impuls s which ri e fr m an ir i table f us f atrial mus le at at s of 250 to 350 per minut The entric lar rate I us lly one half the atrial rate (2 1 cond ction) but it may be l s (3 1 or 4 1 co duction) or ery ar ly a 1 1 co ductio m y oc u w th a very apid ventri ular rate The vent icu lar rate i us lly regular but if there is a signifi a t A V block it may be i egular and m y imulat trial fib illation At ial flutter u ually r ults from any of the ommon c uses of hes t di e e and it may occu infreq ently in the absen e of hea t d ease It may b p od ced by quinidine during the tre tment of at ial fibrillation

T e tment

A Tr atm t of Par xysm l Flutt r Similar to t e tment of p xysm l ta hy dia e ept that digit lis d quinidine are the dr gs of ch ice The arrhythmia te ds to become estab li hed mor oft n than do at ial o dal ta hyca di Pro phylaxis of r urre t attack i arri d o t similarly to that desc ib d for atrial t chyca dia (e page 173)

B Tr tm t of Chr ic Atri l Flutt

1 Dig talis i th d ug of ho e it inc ea es the A V blo k and pr ve t a 2 1 1 1 conduction I ab t half f th a atrial fibr llati n sin s rhythm results from full digitali ation If at ial fibrillati n rem ins ft it h s been prod c d by digitalis qu nidi e sulfate m y be added to c n t to sinus rhythm Digitali may be given by any on of th l m thod (s e p ge 197) O l medicati n i u ally suffici nt lth gh the int av s oute m y be used if the situat n i critical Digital m st ften be given in la ger dos tha a e lly r q i ed for ardi c f i Wh n a fixed 4 1 co du ti n i prod ed by digitalis a slightly in e ed dos may v rt the fl tte to atrial fibrillation or sin s rhythm

2 Qui idin Sulf t U S P B P Thi dr g hould not as a rule be used to tr t atrial fl tt unles th patient is f lly digitaliz d with a slow vent ic l r rat becau e of the dan g of p ducing a 1 1 co d tion If digitalis res lts in o ly a 4 1 c du tion or prod s tr al fib ill ti n which do s n t spo tan usly c nve t to sinus rhythm q inidine may be g v n (s e atrial fib ill tion bel w)

ATRIAL FIBRILLATION
(Pa oxysmal code No 425) (Chronic code N 426)

A omm n hythmia d e t ectopi impulse ri g i th t ium at v y pid rat (400 500) they oft n f llow va iable at i l pathw ys Th ve tri ul t is alw ys i r gul r m st c mm ly v ying b tw n 110 and 160 but may b slow o fa ter dep ding pon the d g ee f A V block Th ch oni fo m i u ally b t n t i iably a so i t d with o ganic h a t dis pe ially rh umati mitral valv di e s o o ary and hype te iv he t di e and thyrotoxic i Th p roxy mal typ m y

occur without apparent reason in normal ind viduals in apparently normal hearts during acute infectious diseases following surgical operations especially of the lungs and particularly in thyroto i osis

Tr atm nt

A Treatment of Paroxysmal Atrial Fibrillation

1 Specific treatment

a *Digitalis* is the drug of choice in paroxysmal atrial f bril lation especially when this arrhythmia occurs in indi id uals with organic h art disease (particularly mitral ste no is) with rapid ventricular rates or when the symp toms or signs of cardiac failure have appear d If there is doubt as to whether one should use quinidine or digitalis first digitalis should be given th s is because it cont ols the ventricular rate by producing an A V blo k which is th immediate obj cti e of treatm nt in such a case The objective of treatment with quinidine is to abolish the atrial ectopic rhythm and it is quite safe to wait until the ventricular rate is brought under control with digitalis Give full digitali ing doses (see page 197) with th ob j ctive of slowing the ventricular rate to 70 to 80 per minut and avo ding toxic manifestations In paroxysmal fib illation ther is no cle r evidence that the use of d g tal s will result n established fibr llation

b In those cas s where an att ck of atrial fibrillation per sists in an otherwi e normal h art with a v ntricular rate unde 180 and with no other symptoms or signs of cardiac failure quinidine sulfate may be used at o ce to convert the hythm to sinu rhythm

If the v ntric lar rate be omes very rap d or if symp toms of dyspne angin l pain or s v re p lpitati ns re produced conversion with quinidine should be temporarily susp nded and digitalis g v n

2 Prophylaxis of paroxysmal f b illat on The prin pl s a d procedure are the same as for atr al paroxy mal ta hy a dia (see page 173)

B T eatme t of Chron c At i l Fibr llat o

1 Drugs

a D gitalis Tho ough digital zat on is the f rst step (see p g 197) The patient i then u ually plac d on mainte nance digitalis ndefinitely Th obj ct of dig talization i to slow the v ntricula rate and to improve myocardial effic ency

b Quinid ne Sulf te U S P B P Qui idin i sed to aboli h the ectopic rhythm once the v ntricular ate i controll d with digitalis It pote t ally ha ard u nd should be used only in car fully sele ted cases by a phy s cian thoroughly familia w th th drug and by a m thod which ensures close medical s p vision (prefe ably in th hosp tal) while conv rsion to sin s hythm i being attempted CAUTION S e page 200 fo dange s f quinidin

2 *Conversion* of chronic atrial fib illatió Opinion a i s but the *following* indications for conv sion of atrial fibrilla tion serve as a ge eral g ide Each case m t b i divid uali ed In ge eral con ersion is att m wh n er it is

tho ght that the p t ent will b b tter off with sin s hythm tha w th trial f b ill t n

a At al fibrillat o pers ting aft r thyrotox o is h s b en t eat d urg lly o by other mean
b Atri l f b illat on of a few week d tio in an ind id l with or nly light diac d e s
c At al fibrillati asso ted with f eq t embol ph n mena
d R f actory ca di c f llur indu d by th t al fibrill t Se re palpitati s d to bil ty to decr a e the v n t icula rat w th dig talis th s may b obvious nly o exe t
f Atr l f b illat on appe r g for the fi st t me po tope at ly p t nts w th a techni ally cc sful mit al valvulot my

DISTURBANCES OF VENTRICULAR ORIGIN

VENTRICULAR PREMATURE BEATS (cod No 441)

A rhythmia in which top impuls r e from any po t n the v tr cl s to s a pr m t b at It is one of th most ommon arrhythmi s and ft n o s i individ ls with ut h a t dis se in whi h t th ca ional e t ic l p emat beat an b gno d Mult ple v nt icul r p ematur beat or thos u i g fr m two o m e f ci th ent icl r se mor on er wh they c i middl g d i d vid als th y r ise the qu tio f d lying o o a y h t disea e Vent i ul r p e matu beat c rring in nd d al w th c on ry h t dis se p lly when they p od ce ymptom or gi l pa few d w th ev g ate n rn Th y m v p esage e t i ular t chy rdi o ventr ula f b illat o Thi s p t ul ly tru f llow i g myo dial inf ctu n Ve t ular p em tur b at may b a soc ted with anxi ty c us of al oh l o tob co or f tigue It i the most comm r hythmia esulting fr m digitali toxi ty

T tm t

A Spe fic M

1 Reassu a and good hygie e If n asso iated d d ea i p e t nd if th ectopi b ats a e nf q e t and p od no palp tat s no spec fic ther py i dicat d r s e th pati t and instr ct him o cerning the elation ship betw his symptoms a d h p so al h bit

2 Adj tme t of d gitalis do g If ntri ul premat b ats re d t digit li toxicity stop th digital fo 3 5 days o until th a hythmi di pp a d then me medi at o in malle do ag At times howeve p ti t with ca di fail re who re e iving digitali m y dev l p v tri ul prem t e b t whi h not du to d gital s t xicity b t to i d q ate digit li at on a d c dia fail If i d bt s to the withd aw digit lis f r l days a d t e t th dia fail r with oth va l bl m thod

(see page 182) In these circumstances the ventricular premature beats often disappear as the card ac failure improves

3 Potassium salts 1 3 Gm (15 45 gr) q i d are often helpful in ventricular premature beats of digitalis origin.

4 Quinidine Sulfate U S P B P This drug should be used orally to abolish ventricular premat re beats when they occur following acute myocardial infarction or when they occur in runs or from several foci in patients with heart disease

VENTRICULAR PAROXYSMAL TACHYCARDIA (code No 442)

A disorder in which impulse arise rapidly and fairly regularly in the ventricle at an average rate of 150 180 per min te This is usually associated with severe myocardial damage espec ally myocardial infarction

Treatment

A The Ave age Case

1 Quinidi Sulfate U S P B P 0 4 Gm (6 gr) orally ev ry 2 ho rs for 3 doses if the attack is well tolerated and the patient is not in shock If the ttack c ntinues and th re is no toxicity from the quinidine increase dose to 0 6 Gm (9 gr) every 2 hours for 3 doses This usu lly terminates the attack If it does not give the drug I V or I M or change to p ocainamide

2 Procainamide Hydrochloride U S P (Pronestyl®) 0 5 1 5 Gm (7½ 22½ gr) orally every 4 to 6 hours may be s b stituted for quinidine if the latter is in ffecti e o produces toxic symptoms

B The Mor S ve e Cas (or when other medicat on has failed)

1 Quinidine Glu onate N F 0 8 Gm (12 gr) o 0 5 Gm (7½ gr) of quinidine base may be given I M and repeated eve y 2 hours for 2 3 dose

2 Procainamide Hydrochlo id U S P (Pron styl®) 0 5 1 Gm (7½ 15 gr) may be g ven I M and rep at d in 4 hours

C The Urgent Ca e

1 Pro a amide Hyd ochlorid U S P (Pronestyl®) 1 Gm (15 gr) given slowly I V at a rate not exc ding 100 mg (1½ gr) pe mi ute During the infusion ontinuous electrocardiograms o at le st peated blood p essure determinations a e essential S vere hypoten ion may result from this medi ation

2 Quinidine may be given I V a Qui dine Gluconate N F 0 8 Gm (12 gr) diluted with 50 cc of 5% glucose slowly (1 cc per minute) with continuo s elect oca d ograms and d termination of blood pressure

3 Vasopressor drugs for sh ck If hock is pre nt a a result of ventricular t chycardia or res lts from th dr gs gi en I V it can be treat d with vasop essor dr gs a described under the treatment of sho k (s e page 30)

4 Other drugs that ha e been d scribed as occa ionally helpful in ventricul r tachyca dia i clude

a Magne i m Sulfat U S P B P 10 cc of a 20% sol ti I V Calcium salts should be readily avail ble to counteract magne ium toxicity (se page

b I V m rphin o mep idi e (Deme l®) a som times
s essf l

5 Digital __ Thr drug i s ally contrai di ted n vent i ular t chy di h weve in ome p t e ts w th rdia fa l e whom the abo m t ned d gs ha e fail d to e tor s hythm full digitali tio gi e efully h be n suc sful

D P e t of V ntri l Par xy mal T chy dia Th dr gs f ho a e q nidin ulfat a d p ocain m de (s p ges 200 nd 205)

VENTRICULAR FIBRILLATION (code N 445)

A ar hythmia d e to i egul in oo dinat m v me t f th e t le whi h is a f eq nt us of s dd d ath It m y be pr sag d by ns of e t cul p m t r beats o v nt i ula t hy rdia It infr q ently d um t d l ic lly e pt wh e pons ble f e urr t tta k of Stokes Adam ync p it fr q ntly b e d d i g dia g y It ra ly oc d ing rdi c cath t i at on It s us ally s iated w th ev e my d al d mag but m y be pr ip tated by pin ph i o toxi d es of quin di e or dig tal s

T e tm t

A D g

1 P ophyl t c Q inidine Sulf t U S P B P Tr tm t is ely ffect unl it occurs th hort p o y mal tt k In th e c umstan p ophyl ct e qui dine ad m n t to m y b tr d

2 P o ai mide Hydro hlorid U S P (P on tyl®) m y be i j t d int the v t i l to prod rdi a rest Th h t m y then be stimul t d by ep ph in o extern l m ss ge

B S gi l a d M h ni l M s S gic l xpo ure of the h t w th di m g d elect c defib llat on is the t atm t f ho and may b l f sav g E te nal pou ding of th h st lect c l stim lati n by a comm ci l l ctr p emake m y b t d if g cal explorat o t po s ble

CONDUCTION DEFECTS

Di orde ca ed by d lays i th rate of co ductio f impul es th gh the h art

SINO-ATRIAL BLOCK (cod No 416)

This i d to a lowi g of imp ls fo mat n n th S A n d whi h if ffici tly ed d esults ithe i th p emak of th h rt be g tak n ov by the A V nod o m r arely a lower t i ular pa mak r Sin t i l blo k mo t c mm nly e ults f om dig tali the py a of d in p s gal timulatio l s fte f om myoc d l dam g in th gion of th i o t i l nod It m y oc In thi t s w th high gal tone

Treatment

None is required generally The causative factors should be eliminated if possible The followi g drugs may be tried

1 Atropine Sulfate U S P B P 0 6 mg (1/100 gr) q i d orally
2 Ephedri e S lfate U S P Fphedrine Hydrochlorid B P 25 mg (3/8 gr) orally q i d

SINUS ARRHYTHMIA

Waxing and waning of the cardiac rate during the various phases of respiration It is a normal phenomenon especiallv in childhood Its main importance is its pos ible conf sion with some important arrhythmias

ATRIO-VENTRICULAR BLOCK
(Complete code No 436)
(Prolonged Conduction code No 434)
(Incomplete code No 435)

D lay in conducti n thro gh the A V junctio al tissues The block may vary f om m re prolongation of conduction time thro gh progressive A V block with arying degrees of block (2 1 3 1 4 1 conduction) to complete heart block (A V dissociation) If complete heart block appears suddenly or if the ventricular rate slows abruptly n the presence of complete hea t block syncope may occur (Stoke Adams syndrome)

Atrio ventricul r blo k occu s infrequ ntly in normal hearts it is usually due to organi h s t d sease In young r ndivid als it most commonly i due to rhe mati feve or diphtheria In older patients coronary he rt disease s a mo e common ause Atrio-vent icular conduction defects may be a sed by d gital s or quinidine therapy

Treatme t

In the absence of Stokes Adams synd ome (s e below) tre t ment of atr o entricula conduct on d fects i r rely accomplished xcept by elimination of drug if they a ausat ve or by the sub sidence of acute myocarditis Prolo gation of the atrio ve tr cular conduction per se needs no treatment unles th re i complete heart block with ventricular r t s below 35/min Cardi f l re or we k ness may occur with slow ventricular rat s Ephedri or Isopro te enol Hydrochloride U S P (Aludrin ® Is prel®) (se p g 181) should be given to increas the rate of the vent icul pacemake

STOKES-ADAMS SYNDROME (code N 455)

This syndr me refers to attacks of yncope as a r sult of v n tricular at ndstill or more rarely v ntricular tachycardi o fibrillation which occurs when an individual with no mal trio-ventricular conduction or one wi h a 2 1 at io ve tricular blo k changes to a comp te atrio ve tricul r bl ck It is v ry rious

nd tion a d s dd death is ommo If ca dia standstill is pro l ng d fo m e th f w sec nds o v ls o s may o cur If the h rt rate in omplete hea t block ab ptly slows t under 20 an att ck may b ind ed or rdiac f il e m y esult

Tr tm t

Try to el minate o t e t th The bject e of tr atm t is t obt in an dio ntri ul r pa make d cha ging at a at of 35/min or mor

1 Eph d in Sulfate U S P Ephed ine Hydro hlo ide B P 25 60 mg (3/8 1 gr) rally q i d i oft n eff cti e The d se must be s ffic ent to pr ent the att ck If n es ry Secob b tal S d m U S P (S nal®) 30 mg (1/2 g) m y b g v n with a h d e f eph drine
2 I op oterenol Hydrochlo d U S P (Al dri e® Isup l®) 5 15 mg (1/12 1/4 gr) m y be given blingually t i d or q i d
3 Epin phri e Injection U S P If att ck ar fr que t and a e n t c trolled by th b ve pin phr e 0 5 c (8 min) of 1 1000 soluti n may be g v ry 8 h s as need d or 0 2 c (3 min) of a 1 1000 ol tion may be give sub ut ev y 2 ho s
4 I t a ardiac Epineph e Injection U S P 0 5 c (8 min) of a 1 1000 sol tio m y be tt mpt d if ca diac tandstill pe si t

BUNDLE BRANCH BLOCK (code No 437)
(Right code No 4442 x37) (Left cod No 4443 x37)

I terfer e with cond t th ough the right o l ft bundle of His Thi i u ually a o i t d with o gani hea t d ea e but m y c in appa tly n mal indi id als (e pecially right b ndle b n h bl ck)

T eatme t

The e i no specific t tm nt for bundle b anch bl k T eat th underlying di ease

CONGESTIVE FAILURE
(Ca diac Insufficiency code No 404)

Co g tiv fail re i a dis d of the diova cul r ystem ed by th failu e of th h rt as a p mp Ma y of th symptoms and sign are d e to the e nd ry ete t n f sodium a d w t T e has be n on d ble t o y a to th exa t d finiti n and m han sm of o gestiv fail r Wh n th h rt fail howe th r is n inc a e in the xtr llular fl id ont t an i c s in v no p es u and ba kw d as w ll as f w d fail

Diagno i

Sympt m and sign i l d dy pnea fir t on e rtion and finally t est orthop a a ed f on in ital capacity p lm nary v e c g stion ral at th lung b es an ab mal un xpl in d

increase in weight veno s engorgement with in reased v ous p es sure a p olonged circulation time tender engorgement of the li er dependent edema and at times ascites

Congeative failure may be the end result of a wide variety of diffe ent types of heart disease and is therefore a functional di g nosis The etiologic diagnosis m st be made separately (e g rhe matic hypertensi e or o onary disease) Cardiac failure is of en classified as acute or chronic and left s ded or right sided These divisions while often helpful are often arbitrary and may coexist

T eatme t

A Objectives of Treatment To increase the strength and efficie cy of the myocardial co traction and to r duce the ab o mal rete tion of sodium and water The patient shares a ignificant re sponsibility in th management of his disease beca se treat ment is long term and invol es restrictions in diet and activity and because the patient s well being and p oduct vity depend t a great extent on his willingness to cooperate

B Co rection of Causative Factors

1 Ext s a d ac causes of cardiac failure Card ac f ilu e may be re ersible therefor in addition to carrying out the ther apy to be outlined below specific search should be made for non cardiac ca ses of failure These i clude thyrotoxicosis anemia myxed ma nutritio al disturban e (espec lly vita mi B d fi ie cy) arteriov no s fistul e poly ythemi v ra and Paget s dise se

2 Elimi ate prec pit ting f ctors Determine and eliminate if possible the facto precipitating the cardiac failure Knowledge of the pr cipitating factor is import nt in tr at ment and in eval ating p gnosis The common fa tors pre cipitati g failu e in lude infection (pe ially r piratory) over ex rtion inc eas d sodium intake discontin ation of medicat on (especially digitalis) onset of ar hythmia p r ticularly with r pid vent cular rates (e g atr al f brilla tion) myo a dial infa tion anemia and unknown factors

C Gen ral M s es

1 R st Rest in bed or sitting n a cha serves to de re the work of the h art and to p omote sodium diur sis Mo phine or barbiturate ind ced sl ep ome as a welcome relief to a patient who ha spe t many sl epless dyspneic ights with his di ease Adeq ate rest should be maintained unt l compensation h s oc ur ed and then should b replaced by progressive ambulation Most patient can s a bedside comm de with no more eff rt than is required f r a bedpan

Ca diac patients at b d rest are prone to de elop phle bitis (See page 217 for prophylaxis) The d ration of rest should be as l ng as ecessary to permit the h rt to reg in reserve stre gth but should not be und ly p olonged so as to cause generalized debility of the p tient

2 Diet At the onset of therapy f eque t (4 6) mall bland low caloric low r sidue me ls with vitamin uppleme ts are indicated R i iction of sodium varies o ly in degree Evaluation of the previous i take of sodium will provid a baseline upon which to ga ge th d gre of r striction e q i ed. Before drastic sodium restri tion is i tituted the

l funct on ho ld b aluat d to d t rmine if the kidneys can nserv s dium (S e p g 187 for low sod um sy drom) In an o as nal case 350 mg (5 1/2 gr) o less of sodium may be th ma im m tolerat d without dev lopme t of d ma although s h e t me rest tion is usu lly ec essary only wh fail i fi st treat d Vitamin s ppl me ts may be i d ted Restr t d diets and ano xia may l ad to mal utrition and avitaminos with a upe ump sed b beri typ of fa l

3 Dig t lis (page 195) Digitali incr es the m chan al eff c n y of th hea t In reas d dia output dec eased ardia e and ve t icular di stoli p essur and a fall in ight at l nd pe ipheral v o pr u e foll w digital t in pati ts with a diac failure The glycos de avail abl a e q al t tiv ly simila They diff r in speed of acti dosag d rat of excr tio It is advisable to be om familiar w th a p d intrave o nd a rapid oral method Rapid dig tal ation is indicated in trial fl tte a d fibrilla tion with fast v t i ula t and in a ute pulmo ary dema otherwis low digitali t on i p ef d (F method and dos g s e pag 197)

4 Rem al of sod m a d wat (See p ge 205)
   a Me u l diu ti M r urial d u etic (CAUTION e page 187 204) t by d easing the s dium and chlo d reabs rption the renal tubule Clinical f f t is n t d in abo t 2 ho by th l M o subc t rout and i larg ly ompl t in 10 12 hou Small quantities of m r u ials (0 5 to l) may result in d q te diu e si and should be s d initially They should be used in the morning so that th i eff ct will have l gely ubsid d by nightf ll Larg doses may initiat mass ve diu e is with e ten ive fluid and el trolyt lo ses Thi an b very distr ing and can prod e untow d symptoms p ticula ly in the older age group Th tio of the merc ial d eti is potentiat d by giving Ammonium Chlor de U S P B P 2 Gm (30 gr) 4 tim daily n th day b f e m cu i l admini t ati Th se of mmonium chlorid f p iods longe than 48 h s h o t a advantage and incr a s th danger of ac d is The s me is t ue f Acetazolamide N N D (Diamox®) g ven 0 25 Gm c o twic daily f 2 or 3 d ys befor the m curial

   Mer aptom in Sodium N N D (Thiom in®) and p h ps Me all ide S di m N N D (M r uhyd in®) m y b gi s b t and sele ted pati ts may b taught to in j ct them elv with the m u al Th p ti t the gulat s th dos g by hi w ght gain Clo e m dical sup rvision is n ces ry to minimi e the possibility of inf tio d dium depl t n e p cially in the pr enc of nal and hepati dis a e

   Th me rial di tics may b give very l 2 day until the p ti t s dema and diu esis h v di pp ed nd his dry weight i e ch d P rticular ca e sh uld alw ys be e cised to gua d gain t a l w sod m syn d me and hypokal mia (s pag 15) whi h may o ur

particularly in patients who receive freq ent mercurials while on a low sodium diet

b Cation exchange resins [Carbacrylamine Resins N N D (Carbo Resin®)] These substances are synthetic macro molecular compounds which undergo ionization and ex change ions for ions of similar cha ge The acid potassium cation combination is probably best for cardiac failure Resins are of greatest value in pat ents in whom urinary excretion of sodium is low and response to mer curials is poor Eight Gm (120 gr) in a glass of water before and after each meal is the usual dos The diet should contain 1 5 2 Gm (22½ 30 gr) of sodium t achieve the most efficient use of r sins and to prevent potassium deplet on Because the tendency to acidos s is increased resins should be avoided in renal diseas The hazards of resin therapy are hyponatremia hypo potassemia a d acidosis These hazards are minimized when the patient eats his full diet if neces ary potas um salts can b given o ally The d ger of calci m deple tion during resin th rapy i slight

c Paracentesis Pa acentesis of fluid in th chest and ab domen should be undertaken if respiration i emba rassed Since sod um retention may occur as a result of fluid col lections in the ch st abdomen and legs di resis may occur follow ng the proc d re

d Me hanical meas res Venesection (in low output failure in the absence of anemia) Southey tubes and ac puncture m y be ben ficial if the ordinary fo ms of treatm nt fail Southey tubes a d acupu tu e are especially valuable in seve e right heart failure with obst nate dependent edema Care must be tak n to avoid a severe low sod um syndrome with hyperkalemia

5 Cool e vironm nt Pati nts are usually more omfortable i a cool room

6 Fluids If od um restriction s observed faithfully th e is no ne d or ind c tion for fluid restriction

7 Exer se Pat ents who are in bed should be given pass ve or active leg exercise to preve t phl both ombosis (ee pag 217)

8 Sed tion Pat nts with cong t ve failure may lso experi e ce insomnia Us s dation arefully t ensu e sleep

D Therapeutic Myxedema Useful in I ronic resistant left ven t cular fail re re istant anginal pain un o trolled ventr lar rate in atrial fibrillation and in fr q ent re rre ces of e tricul r t chycardia not ont oll d with q nidine It is s c ess ful in about 40% of w ll chosen c s s but a e e t ial for the patie t and should not be ndertake l ghtly Myxedem npleasant and th c r may be w e than the d as
Any of the m a ures sed to t at hyp thy oidi m may b employed (see page 370)

Observation Duri g Treatment of Cardia Fail

A careful clinical ecord hould b kept of all patients bei g treated for cardiac failure so th t their course c n be fully followed and therapeutic hanges mad s need d This re ord should in clude the following ob ervations on every visit

1 St tus of origi al symptoms
2 New sympto ns
3 Mo ning we ght o w ight w th s m lothes
4 P esen e of the signs of co g tiv f lur (veno engorge m nt and pulsat o s p lmo ary ale ple l fl id en gorg m t of th l ver p ese of ed ma)
5 Examination of th he rt a d blood vessels (c diac sounds g llop hythm fr tio r b cardı rhythm and ap l rat ca diac si e pe iph al a te ial pul at on and stat of th ve ns)
6 Blo d pr u a d pr e c of pulsus alt nans

ACUTE PULMONARY EDEMA (cod No 324)

Acute pulmona y ed ma is a g s em rgen y Prope under standing of th p ecip t tung f ctor d underlyi g d eas is n ces sa y f r th phys ian to utilize the a io s therapeuti pos b lities i the individual cas (e g in a mild att ck morphin and est in b d alone m y s ffice ın an att k d e to trial fib illation with rapid v nt c l rate la tos d C dig xın given intr enously may tak p ec d ce e some of the th r p o edur m tio d b low)

Eme g ncy T eatment

A Pos t Th p tient hould b elev ted to th semi Fowle b d po it on (se p ge 3) or plac d in a chair thus de e s s th veno return to th h rt
B M rphin Sulf t U S P B P 15 30 mg (1/4 1/2 gr) I V or I M I anxiety d p es es pulm n ry efl es d i du es sleep Th att ndant l sse ing of the for ful espir tion d eases the n g t ve i t athō a ic p ess e and the ven r turn to the h t
C Oxygen wh n labl should be admini ter d i high con en t at ns Thi is best ch ev d by mask or in the s of hild n by h od or t t Mode te on ent tion (40 to 60%) ca be a hie ed by o ygen te t or asal athet Oxyg n re liev hypoxia d dysp ea and dec eas pulm nary capillary p rm ability (se page 144)
D R d tio f Bl od Vol m
   1 Tou iq ts Soft rubber to n q ets o blood pre c ffs pplied with ffici t p ess e to ob t t ve us but n t a te ial flow d rot ted every 15 minutes will effec ti ly ed e the ou r t rn to the h rt Th tourniqu t sh uld b mo d g d ally a th atta k bsid s Appr x imately 700 f bl od m y be tr pped in the xtremities by this meth d
   2 V nes t on (300 to 700 c) Thi i the most dir t w y of r d i g the v t rn to th heart nd may tr ki gly i e the di o tp t and de ea th right at i l and p ripheral us p es r ın l w tput di c f ilur Thi p ocedu should ot b do e if a emi is p t
E R pid digitalization i f gr at val (ee p g 197) E t m C e hould b ci d in gi ing digitali intra o ly to a p lo sly digitali d p ti t

F Aminophylline U S P B P 0 25 0 5 Gm (4 7½ gr) slowly I V has been advocated Oral aminophylline is relatively in effective I M aminophylline is often painful Rectal aminophylline suppositories 0 25 0 5 Gm (4 7½ gr) may be helpful.

G He amethoni m In the acute pulmonary edema of hypertensi e heart disease and in the presence of severe hypertension a slow intravenous infusion of hexamethonium 1 mg (1/60 gr) per minute to a dose of about 5 to 10 mg (1/12 1/6 gr) may be very helpful The inf sion should be stopped when the systolic pres sure falls to 170 mm Hg so as not to overstep the mark and produce hypotension

REFRACTORY CARDIAC FAILURE

The refractory state is said to be present when the patient fails to obtain clinical improvement after the usual therapeutic measures outlined above When this occu s the following procedure is ad vised

1 Re eval ate the total situation Has the bed rest been ade quate? Is the patient ingesting more sodium than ord red? Has he been receiving his therapy carefully? A review of the patient s activities diet and medications is essent al
2 Are unrecognized recur e t pulmonary inf rction anemia masked hyperthyroidism vitamin d f cie cy sil nt myo cardial inf rct on or arrhythmi pr sent?
3 Have complications such as acute rheumati myocarditis or subacute bacterial endocarditis been superimposed upon a rheumatic heart?
4 Are there electrolyte abnormalities which may have re lted from di t merc rials and resins if thes h ve been u d? Electrolyte disturbances may lead to merc rial esist nce produce a low sodium syndrome or in the case of potas sium enhance digitalis intoxication

MANAGEMENT OF CONVALESCENCE

Sp cific Measu s

A D git li au Once digitalis is instituted it is u ally ces s ry to conti e the administration of the drug for life (s e p ge 195)

B Low sodi m Diet 1 5 Gm (22½ gr) NaCl (750 mg or 12 gr Na) per day (e p ge 53) It is ad isable to che k the p t t s se um sodium or u inary sodium freq ently to b certain that no deficiency is occ rring An inadequ t sodi m intake in the presence of s vere ren l imp irment c n precipitate fatal enal failure

C Merc i ls These d ugs should be used as f ely as i ded even as frequently as 2 to 3 tim s per week in prolonged main tenance in order to remove any accumulating edema (see page 204) Care must be taken not to ause sodium depletion or dehydration Some p tients will pref r the addition of s lt to the diet as long as me curials will remo it from the body Many patients can be sav d from evere ch onic cardiac

invalid sm by the liberal but j di ious u e of mercurials Am mon um hloride may be given o ally t potenti te the me c rials (e pag 204)

Gen al Meas e

Provide ad quate est and exerc se within toleran e Ca eful attention should be pa d to the t atment of the n n cardia cau es of rdiac failur (see page 162) and to the avoidance of p ecip tat ing f to s (ee page 182)

ELECTROLYTE DISTURBANCES IN CARDIAC FAILURE

During tr atment of rdi f ilu e th e typ of el ct olyte d turbanc m y be se n

Hypochlo emı Alkalosis

A M ch m Thus s d e to chloride exc etion out of proportion to odium loss foll wing m u ial di r is This p odu s a l w serum chl ide a d a high s rum bi a bonate Se um odium and potassium le ls may be normal low Symptom of dehyd tion may b p es t dry mu s m mbra es and loss of t e tu gor and a latent o manifest tetany

B T e tm t

1 Ammoni m Chloride U S P B P 4 6 Gm (1 1½ dr) per d y f r 3 to 4 days and rep t afte a rest interv l of 3 to 4 day

2 Pota i m alts m y be dded if a d f c t exists (s below) If t tany p e t alc um salt mu t be given onc rre t ly (s p g 302)

Low s dium Syndrom

A D gnosi Th on t of weakness oligu ia diaph si and az t mia h alds the low alt ynd me H t w ath r fever s d vomiting ar dditional p edispos ng fa to s Low s r m sodium m y be pre t witho t alkalo is o a dos or it may be c mpl ated by dehydrat and acido is It may foll w s ve odium estriction ccompani d by mer urial di is

B Tr tm t

1 Mild s In reas sodium intake

2 Se er c s T t with I V hypertonic alın (ee p ge 15)

Hypokal mia

A Thi may r ult f om x s e pota ium exc tion from mer u ial diu i a ta ol mide (Di mox®) o th us of a id or amm ni re i s in pati nts r eiving a low sodium diet Hypo- kal mi may induc d gitalis i toxi tion and is manif ted by mu la w ak pa ti ul ly of the m scl of r spirat on

B T tme t Pota ium Chlo ide U S P B P 3 6 Gm (45 90 g) daily by m uth provid d the e is no r nal failure CAUTION Par ter l potas ium salts sh uld not be given in th p se of a idosi o enal failur

PERICARDITIS

ACUTE FIBRINOUS PERICARDITIS (code No 420)

Acute fibrinous pericarditis may be caused by or associated with many diseases The most common are rheumatic fever uremia collagen diseases tuberculosis viruses and malignant disease Acute fibrinous pericarditis generally prod ces little functional impairment for there is no mecha ical interference with cardiac function *The most distres ing symptom is pain and this* may be entirely absent It varies from local discomfort to very in tense pain which is usually subster al or precordial and may be confused with angina or infarction

Treatment

Treat the underlying condition and provide analgesics as neces sary for relief of pain Salicylates and/or corticotropin (ACTH) o the cortisones are useful in rhe m tic pericarditis (s page 518)

PERICARDITIS WITH EFFUSION (code No 420 100 8)

The diagnosis of pericarditis with effusion is import nt bec u the fluid accumulation may cause d reased cardiac output and ve nous ret rn resulting in cardiac tamponade This d es not respond well to the us al treatment for cardiac failure (digitalis low alt diets etc) but removal of the pe icardial fluid may be life s ving This is i frequ tly requir d i the common varieties of pe icard: l effusion with the exception of tuberculo s pericarditis Both the rapidity of accumulation and the amo nt of fluid are important d termining the fun tio l impairm t

Diagnosi

Symptoms and signs in lude app hensio dyspn a yanosis distended neck vein ta hy ard a pulsus pa doxus in rease of area of cardiac dullness f ble or absent apex b at and diminished heart sounds Pericardial f iction rub may be p esent The chest x ray reveals a water bottle shap d heart shadow th Ecg shows low voltage of the QRS complex and T wa bnormalities Diagnostic aids include c rdiac catheterization or veno s angio cardiog aphy confirmation is by pericardial tap

Treatm nt

A Emerg ncy Treatme t (*Paracent sis*) The indic tions fo pericardial pa acentesi ar the symptoms and signs of cardiac tamponade A the pericardial fluid inc e ses in amount and particularly when it increases rapidly the veno s p ess e may r se considerably and the cardiac output may p og essively fall When this occurs the pati nt becom we k pale and dyspneic the pulse pre sure becomes very n r ow and the pulse rapid and thready i e the patient goes into shock Under these circumstances the removal of the peric rdial fluid may be life saving the fluid sh *uld be remo ed lowly to void* cardiac dilatation or seri us cardi c reflexes

1 S tes of puncture *Avoid puncture of the ventric lar muscle*
  a L ft 5th or 6th int sp ce bout 1 cm within the area of ca d c dullness or 1 2 cm inside the l ft heart border s lo li ed by x ay (o ghly 7 8 cm outside of left t nal line) The ne dle is p shed lowly inwa d and slightly upwa d If eff ion is pr se t one hould fi d fluid w thin 3 5 cm (at times 7 8 m)
  b Epigast ic ar a Area between x pho d proc s and l ft st n l margi Ins rt the ne dle upward at an angle of abo t 30 and pointed towa d the midli e The p i r dium l r ched t about 3 4 m
  c P sterior pp oach To be u ed, as a rule only when th bov appr che a e uns c ssful rarely us d if o e u p ts p ule t p cardit On ente s the 7th or 8th int sp ce in the mid apula line Th left arm is el vated to otat th s pula out of th way The needl is di ct d inward a d medi lly
2 Eq pment
  a No 16 o 18 needle with ho t bevel and fitting stylet
  b No 26 o 27 n edle to infiltrat the skin w th procai
  c 20 30 c syringe to emo e fluid Syring should be onne t d to needle by a 4 inch piece of ubbe t bi g to pre ent c ssiv mov ment of the ne dl
3 Te hnic
  a Cl an and steril e kin ov a ea to be pun t d
  b Dr pe urrounding a ea with sterile tow ls
  c Infilt t skin with 1 2% p o ine olution
  d In ert e dl (detached from sy inge and without a stylet) slowly i to skin f llowing dir ctio s ac ording to site s le t d (abov)
  Withdrawal of fluid When the fluid is n ount d it must b withdr wn very sl wly sudde withdrawal of th fluid may result i acute cardia dilatation failu e o death S me o id r it ad is ble to epla e half th am unt of fluid withdrawn with air both to p v t ex sive dilata tion and to gi e bett vi uali tio of the p oces by x ray With the n edle in pl ce move 20 c po tions aft th withdr wal of e ch portion inj t 10 c of l
  f After the eedle is r moved a simple bandage over the edl punct l ad q at

B Spe if c M u e
  1 T b r ulo s p i rd ti (ode No 420 123) The cur ent t e tment s to tre t th syst mi inf tio with bed re t tt tio to trition d other ge ral fa t s a d int n iv a ti t be culos drug th py (e p 131) If the fev r a d igns f pe ic dial ff n do not rapidly sub id and a e still ob iou in o month s gi l d c rtication of the p ri a di m should b c sid ed in o d to p event chronic con tricti pe i ditis Judg m t is eq i ed to det r mine when th dis s is p g e si g despit medical tr t m t a d wh n igns of o t i tion appe i g
  2 Rh mati pe i diti with effusion (od N 420 196 8) T t for rh m ti f The salicylat s m y h lp in

causing fluid resorption Paracentesis is usually unneces sary but should be performed if tamponade occurs

3 Hydropericardium due to heart failure (code No 420 522 8) Treatment of the congestive failure is usu lly s fficient
4 Hemopericardium due to rupture of adjacent structure (code No 420 532) Usually post traumatic If fl id accumulation is excessive *remove fluid at once*

PURULENT PERICARDITIS (code No 420 100 2)

This is usually secondary to other infection elsewhere b t is at times caused by co tamination of a previous pericardial tap

Treatment

A Specific Measure
1 *Syst m c chemothe apeutic agents* Treat infection with indicated chemotherapeutic agents (see page 514)
2 Interpericard al antibiotics At the time of removal of the fluid instill 50 000 150 000 units of penicillin or the approx imate topical amount of streptomycin or other indicated anti biotic into the pe icardial sac dep nding on organisms found (see page 514) and repeat whenever a tap is performed Chemoth rapeutic age ts should be continued as long as purulent effusion is present

B Ceneral Measur s
1 Paracentesi Perform as n eded to relieve pressure
2 Pericardiotomy If fluid is encapsulated or patient is not responding to therapy surgical d ainage may be necessary

CHRONIC CONSTRICTIVE PERICARDITIS
(code No 420 4)
(Tuberculous pericarditis code No 420 123 4)

This is usually d e to tuberculous peric rditis In the remai d r of cases the tiology is unknown a few in tances occur following acute nonspecific p ricarditis or traumatic pericarditis

Treatment

A Gen ral M sur s To combat ascites and congestiv failure
1 Low s d um d et
2 Mercurial diuret cs as need d to k ep patient dry (s e page 204) This m y be combin d with intermittent ammo nium chloride as in cardiac f il re
3 D gitalis is usually of little valu

B Surgical Removal of Con t ict ng Peri rd m This procedure can freq ently restore a pat ent to normal health If ong ative phenomena are chronic or the pe icarditis i progres ive sur gical inte vention is the only method offe ing po sible cure

NEUROCIRCULATORY ASTHENIA (code No 004 580)
(Da Co ta s Syndrome or Effort Syndrome)

N urocirculato y asthenia is a chr nic diso der of young adults whi h i on idered t be a psychiatric diso der it i cha acterized by f r rdinal sympt ms dyspnea on effort palpitatio s left ch st pain and asy fatigability The symptom are often more lo ely relat d to the emotional connotatio s of effort than to the ff rt itself Examinat on ev als no clinical findings of heart dis se ltho gh tachy ardi is often p es nt

Treatment

A Psychotherapy and R s uranc The medi al examination and th manner of handling the p t t h ve important therapeutic val e
  1 Medical xamination should be tho o gh
  2 The patie t should be a s ed that no organic dis d exists
  3 P y hotherapy Furth r and more inten i e psychotherapy may be of valu

B G n al Meas es
  1 T e tme t of hype ventil tion An c te attack may be b rted by th administration of 5% arbon dioxid r b thing in a b g or by holding th b eath Do not give ammo ium hlo de It do s not el eve ymptoms and m y precip tat a idos Inasmuch a fixed ba e has been lost J *compe s ting f r th alk l is*
  2 Good hygien with mode tion in all activities a w ll b lan ed diet a d p ogre si e incr as in xer is unde s p rvis on nd w th en o ag m nt

Progn si

Th pr gn sis for urviv l s good b t is often dis ou gingly poo f r r l f f sympt m

PULMONARY HEART DISEASE
(Cor Pulmonale)

H art dis e econdary to dise e f the l g o of th pulmona y arterie Emphyseem p lmonary fib osi ili osi and kyphoscolio is ommon caus of h co pulm l

Di gn si

A Symptom Symptoms of the d lyi g pulmonary disea e m y b p esent gh with sp tum dy pne nd oft n whe zing pre ede by many y th sig s of pulmon y hyp te sion right e tri ula hype trophy and failu

B Signs
  1 S gns of pulmon ry hyp t nsi Systoli pul tion a d murm r in the pulmona y a ea p lp bl second ound in pulmonary a c t at d, clo ly split e ond sound po sibly ly dia toli mu mur of pulmonary insufficie y
  2 Sign of ight ve t ic l hypert ophy Heaving right en t i ular impulse in th left pa st rnal w k tapping pical impuls p y toli gallop in th xiphoid ar a

3 Signs of right ventricular fail re follow usually with sinus rhythm and with arterial oxygen saturation less than 85%
4 Evidence of central cyanosis and high output state may be present

Treatment

A Specific Measures Appropriate antibiotic therapy for the re spiratory infection that so commonly precedes failure in this type of case Th patie t may be afebrile

B G n al M asures

1 Int rmitt nt oxygen therapy possibly by positiv pressure to increase arterial o ygen saturation and to decrease pulmo nary arterial pressure Cont nuous oxygen therapy should be avoided and the patient closely observed for st por and coma since carbon dioxide retention may occur w th oxygen therapy in these patients (s e page 144) Intermittent posi tive pressure mask breathing e g with the Bennett or Emerson resp rators at pressure settings of +10 to +15 (in spiration) and 0 (e p ration) may be helpful The val e may be operated by an atte dant if th patient does not breathe spontan ously These devices provide a conven ent effec tive method of administ r ng bronchodilators antifoaming agents and aerosols They do not restr ct cardiac output
2 In cor pulm nale intermittent positive pressure breathing is the single most effective therapeutic measure
3 C N S d pressants espe ially narcotics barbiturates and hypnotics are strongly *contraindicated* in the treatment of cardiac failure secondary to prim ry pulmonary dis ase (cor pulmonale) due to th i ma ked de ressant action on the respiratory cent rs
4 The usual methods of t e tment of heart failure should be used (see page 182) bed rest restriction of sod um mer curial diureti s and d gitalis Digital s may not be effecti e if there is a high cardiac o tput state

CARDIOVASCULAR SYPHILIS

Cardio as ular lues may manifest itself a n ompli at d syphilitic aortitis syph litic aortic insuffici n y saccular or fusi form aneurysm of the aorta or as angi a p ctor s due to n olve ment of the ostia of th oronary a teri s

The diagnosis m y be support d by a history of syphilis vi d nce of the disease els where in t e body (especially C N S syph ilis) and a positive s rologi al t st f r syphilis Serological tests are negative in about 20% of ases

Treatm t

A Spe ific M asures

1 Tr at latent syphilis (see page 440)
2 *Therape* tic accid nts s h as th Herxheime r a tion a e rare with penicillin it is therefore not c ns de ed n e sary to precede penicillin tr atm nt with iod d s o bism th
3 Seve al subsequent courses of penicillin are advised by some a thorit es at intervals of 6 months or 1 y ar e p c ial) if the serology remains positive

B G e l Me u s
1 Bed t is d si able d i g the our e of tr atme t with pen cillin
2 S rgical rep ir of the aneury m has b en attempted b t is best c side d as being in the explo tory stage

SURGERY IN THE CARDIAC PATIENT

Pa t la Ha a ds of Surgery in the C d a Patient
A The usual ha ds f g ry a e pa t ul ly g e t in s gery of the cardiac patient shock h mor h ge anox mi th ombo embol m a d infect on
B The abo e ha a ds may pr cip tat any of the following coro n ry insuff cien y p ially if th p t ent has oron ry dis e se ca di c f l and ca dia a hythmi s

Ca d Ri ks f Ane th ia
A Hypote on f llowing pr op ati e sedation a d inducti n may p c pitate o on ry i uff ci ncy a d/or r hythmia
B Str ggling du ing i d cti n incr s the w k of the he rt
C Anoxi i pa t ul ly eriou and may au c o ary insuf ficien y ardia f ilu incr as d pulmon ry hyperte s on o a hythmi s

Su gi al Risk Invol ed in Particul r Ca di Le ion
Th m j ha ards e onary di e a ti st o is espe ially if ang na and ync pe are p ent syphiliti ca di v ular di e e d Stok s Adams atta k
A Rh um ti He t Di a With th ex epti n of ortic t nosi th lesions inv lv ha rd dep nding n the fun tional tatus of th l i n
B Hype te iv P tie ts A a ule these p ti ts do atisfac to ily in the abs e f rdia or e l f il e
C Coron ry Di ea e This c rries th g e t t risk pe ially in th a f r ce t nfar t n (about 5% dditional ha ard) Postop r t ve i f r tio may cc if th e i significant f ll in blood p su e and c ronary in uffi i y Stok Ad ms atta ks may occur
D Syph liti Ca dio sc la D ea e Especi lly if associ t d with ang n thi l on gge ts n l em nt of ro ry ost a and udden d ath may oc

A sthe i in Ca di P ti ts
A S gical p o d i rdia patient r q i e a kill d an s th tist sing ane the i with wh ch h is mo t experien ed
B Adeq te xyg nati n m st b m i t i d t all time
C A oid yclop op e pt f r ind ti beca s of d g f a hythm as
D Ind cti mu t be smooth
E A oid hypoten on and t t promptly if it oc r

Man g m t of th S gi l Ca dia P tient
A If the p ti t ha had nt myo a dial infa ctio postpon s gery f 3 t 6 mo th e cept i the m st urg nt cas s

B Postpone surgery for at least 3 weeks after recovery from congestive failure
C Exercise caution when giving fluids containing sodium (including blood) to avoid producing pulmonary edema
D Treat anemia prior to surgery
E Treat malnutrition and avitaminosis especially avitaminosis B prior to surgery

THE CARDIAC PATIENT AND PREGNANCY

Stat s of Pat ent

The following informat on will assist in making an estimat on of likelihood of cardiac fail re

A Function l class p ior to pregnancy
B Age of patient
C Size of heart
D Struct ral lesion of hea t
E Presence of arrhythmias
F Socio economic status (g if children are at home or if the patient must wo k)
G Intellig nce and cooperation of patient (e g can the patient rest? Can she tay on a low sodium diet?)
H Presen e of associated disease

Some Factors Which May Pre ipitate Failure in Hea t Disea e

A Excessive work
B Upper respiratory infe tion sodium retention
C Anemia
D Paroxysmal ar hythmia
E Excessiv sodium int k e g diet sodium bicarbo ate for gastric a idity infusio s of saline plasma or blood
F Rheumatic activity

As a ment of Risk of H a t Dises e in Pregna cy

A Little or No Fun t o al In apa ty P actically all patie ts who a e asymptomat or who have only mild symptoms with ordinary activities may be allowed to contin e to term under lose medical supervis on If they dev lop more seve e symptoms with activity they should be ho pitali ed t eated for fail re and k pt in bed until term
B Moderate or Marked Functional In p city If the patient has pu e mitral stenosis a d de elop acute pulmonary edema or has moderate to marked symptoms with activity mitral valvlotomy should be consid red This has been suc essfully accomplished up to the eighth month If the patie t does not ha e an operable lesion she hould be hospitalized treated fo cardiac failure and kept in bed u til term
C Very Marked Fu t onal In apa ity All pati nts seen duri g the first tr me te who h symptoms on little or no acti ty and who do not have an ope able cardiac lesi n sh uld be aborted becaus of the high incid ce of r urrent fail re and death in this gro p of patients
D Sodium should be restricted after the second month

Physi logi al Load Wh h Pregn cy Impos on th Hea t

The w k of the h t i ses by about 50% t th beginning of bo t th third mo th when the blood olum and rdiac output in rea e The pla e ta a ts as an rt iovenous f stul Cardiac failure may o ur at any time f om the end of the f rst trimest up to 2 to 3 week bef e term at wh h time the l d fo om un ac ount ble r a on d reases

Man g m nt of Labo

A C r t opin on holds that v ginal deliv y is to be p fer ed e ept in thos as in whi h there an obst trical indication for esarean s tion Coar tat on of the a t may be the only exc ption to vag nal d l e y b caus f th dang of r pt r f the orta

B The s cond t ge should be mad a short as p sibl usi g for eps when p sibl

C E gonovin Mal ate U S P (E gotrat ®) sh uld p obably be vo d d b us of th in eas d work of th heart which follow

CARDIOVASCULAR DRUGS

DIGITALIS AND DIGITALIS LIKE PREPARATIONS

A tion of Digital s d Digitalis like Pr pa tions

A I gest e fa lu e digit l s c e th f rc f ont cti n of th myoca dium th s in eas ng th eff cy of the heart Digit l s ignif antly incr a e c diac o tp t dec eas r ght at ial pres ure d c eas th renal veno s p ssu and in cr ses cr tion of sodium nd w ter and so esto es som of the h modyn mic a d m taboli lt tion of c dia failure The i r as d rdia o tp t ca es d cre e in venous p es u how ve a dir t eff t on the v n moto system has also be p tul t d

B I the ar hythmi s (spe i lly at ial fl tter nd f b illation) d gitalis lows ond tion b twe tri m nd entri le a d de pr ss th S A and A V nod both by d ect a tion and by timulation f the vagus ne v

P i ipl of Admi i t tio

A Co ept f D git l S t t on (Digitali tion) Digitalis m st b dmin t ed tially n la ge do in order to chieve tiss at ti n a d obtain a ther peuti eff t Afte d git l ati n h bee c mpli h d sm ll r dose pres ting the amount m taboli ed d xc et d r admini t d daily a long indi ti ns f digitalis per ist (sually for life)

B Crit ia of Ad quate D gitali ti Digitalis is admin ter d ntil a th pe ti ff t h be n obtai ed (e g r li f of o g t ve f ilu e o sl wi g of th t i ula rate in t ial fibril l t o) o th e liest toxic ff t (anorexia) i ea hed

1 Cong ti f il with n mal hythm

Di eti ti n is d q at d ed ma fluid i l t

b Cardiac size is decreased as dilatation becomes less
c *Venous pressure and circulat on time return to normal*
d Decrease of heart rate results if increase was due to failure
e Engorged tender liver becomes smaller and non tender

2 Atrial fibrillation When the rate is below 80 after exercise one can usually consider the patient adequately *digitali ed* The following simple exercises are adequate
a Bed pat ents Sit up 5 times
b Ambulatory patients - Hop up and down on one foot 5 times

3 *Ecg effects* The most charact ristic change which digi talis produces in the Ecg is sagging of the ST segment and displ cement of the T waves in a direction opposite to that of the main deflection Later there may be a prolonged P R interval The ST T changes cannot be used as crite ia of digitalis toxicity for the effects appear befo e sat ration is present and persist for 2 to 3 weeks after digitalis has bee d co tinued However the Ecg is often of value in deter mining whether digitalis had been administ red in the p st 2 to 3 weeks and may give one an idea of the amount

C Toxic Effects of Digitalis There are no non t xic digital s p ep rations and the difference between the therapeutic and toxic level is v ry small
1 Slight toxicity Anorexia
2 Moderate toxicity Nau ea and vomiting h adache malaise
3 Considerable toxicity Diarrhea ectopic beats (espe ally ve tricula) blurring of vision conf sion disorientati n
4 G oss toxicity Severe diarrhea abdomi al pain high degree conduction blocks and atrial or ventric lar fibrilla tion

D Relatio ship of Digitalis to Potassi m Ion Rec nt work indi cat s that there is an antagon' m b tween potassium and dig tali and that digitalis toxicity is more likely to occur in any clinic l disorder in which decreased potassium of the cell or of the serum is present This may occur with pota si m diu esis from mercurial compound following ortisone therapy or in any condition in which def ncy of s rum potassium is p o duced In the ircumstan es the d se of digitalis should be reduc d or pota ium io h uld be giv n

E Treatm nt of Sev Digital s Intoxication Omit digitalis c m plet ly until the int xication has subsided a d t eat the ca diac failure with othe means Give pota si m salt 4 to 8 Gm (60 to 120 gr) orally per day in di ided dos or depending upon the clini al u gency well dil ted intrave o s potassium salts slowly (not mo e than 10 to 20 mEq /hour)

The differentiation *of d gitalis toxicity a d i ad q ate dig talizati n* is som times quite *difficult* The only safe p oce dure if uncertain is to omit digitali a d treat th a diac failure with rest iction of sodium merc rial di retics and other means to improve the cardiac function If n usea omit ing or *arrhythmias which are susp t d of being d e to digi talis are in fact d e to digitalis* they will s bside in 2 to 3 days if digitalis is stopped The use of rapid cting int a ous

digit ll preparations t d ff entiate thes two linical states is ot advised b us of th isk involved

F Th cardi al principl s of dig talis the apy emain th m wh ther one uses a cr de drug such as the whol leaf o e of th purifi d gly osid s Th y all have b oadly imilar phar m colog al a tions diffe ing only in the extent of the r a tio pr d ed Th e differen es m y be utill ed to ad a t g n th t tm nt f th i di dual p ti t parti ularly w th re p ct to pot cy sp ed of acti xtent of abso ption and d ration of a tion

I di t s a d Ro t s f Admi ist tion

A I di t s fo Admin stration of Digital

1 C di c f il e l ft r ght or comb ed w th e ther sinus hythm or tr al f b illat
2 Atri l fibrillation or flutt with a rap d ve tricula at
3 S p ve tricular p roxysm l ta hycard a
4 P rior to cardiac s ge y especially mitral valvulotomy in patie ts w th sinus hythm so th t if par xysm l atri l fibrillation o cu d ring o following surge y the v nt icu lar r te will not b e si ly r pid
5 Th p ev ntio of p o y mal atr al r hythmi s in pat ts in whom quinidi e h failed o ann t be tol rated

B R t s f Adm ni t tion

1 O al dm nist ti n is sed n all a es when ver digital s is eeded and p rent l admini t ati n s n t indi ted
2 P te al admini t ation
   Em rg ncy digitali t on
   (1) A te pulmon ry dema o ther s fail
   Caution sh uld be used in giv ng the full digit lizing d e in a si gle inje t n i t eno ly under thes i cumstanc The dr g hould b g v slowly in di ided dos
   (2) T eatm nt of t ial hythmi wh n th n ed f r ont ol f th v nt l r ate i u g nt
   b In bility to t k digitalis o ally Na s a and vomiting due to any au oma postop t ly

M thod of Digitali t

A U t e t d C Wh n th patie t h ived n digit lis p eparat on in the pr edi g 2 w ks

1 Par nt al digitali tion (n d i urg t) *CAUTION lever administer a full digitalizing dose I V un less it is certain th t n digitalis ha been taken in the preceding two we ks Always give I V preparations sl wly*
   a Sel ct drug d si ed a o ding to rapidity of ff ct need d
   b Initial dos g s h dul E c pt in ma k d me gency do ot gi e th e ti e av age digitali ing d s in a i gl dos A good g n al ule is to give 1/2 to 2/3 of th a g digit lizi g d immediately and follow with the emai de in 2 t 4 h ur Obs rv fully f digi tali to i ity (pag 196)
   Addition of o al dig talis At th tim th t th init l d e is gi en pa e t ally it advi ble to give orally

DIGITALIS AND DIGITALIS LIKE PREPARATIONS

	Gly id	P p tion A il bl	Digit li ing D	M th d f Administ ti	Sp d f Ma imum A tion and Dur tion	Maint nanc D
PARENTERAL	Ouabai U S P B P	1 amp 1 0 25 mg (1/240 gr)	0 25 0 5 mg (1/240 1/120 g)	0 25 0 5 mg (1 2) dil t d in 10 all sl wly I V f llow with anoth d g (b low)	1/2 1 1/2 h s d tion 2 4 d y	Not u ed f maint anc
	De la osid U S P (C dil nid D®)	2 and 4 amp 1 0 4 and 0 8 mg (1/150 d 1/75 gr)	8 (1 6 mg) (1/40 g)	6 (1 2 mg) I V I M and f ll w by 1 2 (0 2 0 4 mg) I V I M q 3 4 hour til ff t is obt i d	1 2 f d r tion 3 6 d y	1 2 (0 2 0 4 mg) (1/300 1/150 gr)
	Dig t U S P (Dilut b f)	1 and 2 amp 1 0 2 d 0 4 mg (1/300 and 1/150 gr)	1 2 mg (6) (1/50 g)	0 6 mg (3) I V I M f ll w d by 0 2 0 4 mg q 4 6 h urs til 1 2 mg 1 gi	3 6) s d ti n 14 21 d y	0 05 0 2 mg (1/1200 1/300 g)
	Dig in U S P B P (Dilut b f)	1 mp 1 0 5 mg (1/120 gr)	1 5 mg (3) (1/40 g)	1 mg (2) (1/60 gr) I V a d 0 5 mg (1) (1/120 g) in 3 4 h s th n 0 25 mg (0 5) (1/240 gr) q 3 4 hou s until ffe t is btain d	1 2 h d ati 3 6 d y	0 25 0 75 mg (0 5 1 5 c) (1/240 1/80 g)
	Digit li U S P B P	0 03 0 06 and 0 1 Gm tabl t (1/2 1 and 1 1/2 g)	1 0 1 5 Gm (15 22 1/2 gr)	0 6 Gm (10 g) t 0 4 Gm (6 g) in 6 8 h 0 2 Gm (3 g) q 6 h f 2 3 d th n 0 1 Gm (1 1/2 g) b.i.d. til ff ct i bt i d	6 8 h s d tion 18 21 day	0 05 0 2 Gm (3/4 3 0 gr)
	Digit i S P	0 1 d 0 2 mg t bl t (1/600 1/300 gr)	1 2 mg (1/50 g)	0 6 mg (1/100 g) t and ep t in 12 hou and th 0 2 mg (1/320 g) b i d til ff t i bt i d	6 8 h d ti n 14 21 d y	0 05 0 2 mg (1/1200 1/300 gr)
	Dig in U S P B P	0 25 0 5 and 1 0 g t bl t (1/240 1/120 d 1/60 gr)	2 3 mg (1/30 1/20 gr)	1 mg (1/60 g) t d th q 0 5 0 75 mg (1/120 1/80 g) q 6 h T 1 3 mg (1/20 g)	4 6 f d ti 2 6 d y	0 15 0 50 mg (1/400 1/120 gr)
	Lan t id C N F (C dil nid®)	0 5 mg tabl t (1/120 g)	7 5 mg	3 5 mg (1/20 g) t 1 mg 1 6 h th 0 5 mg q 6 h until ff t i bt in d		0 5 2 5 mg (1/120 1/25 g)

0 25 mg (1/240 gr) t bl t ly i ilabl in U S

a erage maintenance do e of the preparation used If th patient i abl to swallow By instituting the drug orally e rly optimum digitalization can be achi ed and main t ined from the sta t It is not nece ary to gi e the same d gitalis glyc side o ally th t w s us d for the initial med i tion (g m y digitali e w th I V lanat sid C and gi e digitalis folium f r maintenan e)

d Ca tion must be x cised A pr vious history of digi talis therapy i oft diffi ult to obtain bec us the new p epa tio ar tast less a d may be in tablets of vari bl col s Th pat nt may be unaw e of the th py he ha been r eiving

D gital toxicity h s b n s n in pati nts who have d nied or wer un wa e of h ng recei ed the drug Th is anothe r ason for a oiding a full d gitali ing d se in a ingle inj tion

e Individuali cour e f ea h patient No dosage s hedule w ll f t all patient

2 R pid oral digitaliz tion (w thi 24 h urs) A si gle oral d gitalizing d is usually unwis sinc nau a and vomit ing ar common making stim ti n of deg ee of digitaliza tion very diff ult

Mult ple oral d es a e u ually q ite adequate and r pid f cti In all ca los medi al p rvis on e qui d b for each d e As digitali at on is pp ach d th drug should be topped at th first sign or ymptom f toxi ity (p g 198)

Oral Admini tration of the Digitalis Drugs

U g n y	D ug	How Admini t d
Mod te	D gitalis	0 4 Gm (6 gr) q 8 hou s for 3 dos
	D g t in	0 4 mg (1/150 g) q 8 hou f 3 do
	D g in	1 0 mg (1/60 g) q 8 hour fo 3 d s
Int r m d te	D gitalis	0 2 Gm (3 g) t i d f 2 day
		0 1 Gm (1½ gr) q i d f 3 d ys
	D g toxin	0 2 mg (1/300 g) t d fo 2 days
	D g xin	0 5 0 75 mg (1/120 1/80 gr) t d f 2 days
		0.25 0.5 mg. (1/240 1/120 gr.) q. i. d. for 3 days.
L a t	Digit lis	0 1 Gm (1½ gr) t d fo 4 5 d ys
	D g t in	0 1 mg (1/600 g) t d fo 4 6 d ys
	D g in	0 25 0 5 mg (1/240 1/120 g) t d f 4 6 d y

3 Slow digitali ation At times it i d i abl to digitali l wly ov th e f a w k specially if the pati nt ann t b lo ly ob er d du ing thi p iod If thi i d any f the p pa atio can be giv n in daily d es 2 o 3 tim s th v rag m i tenan e dos f r 5 7 day Th t t l digitali ing dos m y be om what g t than whe rapid digitali tion i ac mplished One m t individuali e

DIGITALIS AND DIGITALIS LIKE PREPARATIONS

PARENTERAL

Gly o id	P p ti A il bl	Digit li ing D e	Method f Admini t tion	Sp ed of M imum Action and Dur tion	M int ance Do e
Ouab i U S P B P	1 amp 1 0 25 mg (1/240 g)	0 25 0 5 mg (1/240 1/120 gr)	0 25 0 5 mg (1 2 c) dil t d in 10 c ll l wly I V f ll w with an ther dru b l w	1/2 1 1/2 h s dur tion 2 4 d	Not u d f maintenanc
la id U S P C dil id	an 0 4 and 0 8 mg mp (1/150 d 1/75)	8 (1 6 mg) (1/40 g)	6 (1 2 mg) I V M an ll w by 1 2 (0 2 0 4 mg) I V 1 M 3 4 h ur until ff t i obt in d	1 2 d ti 3 6 d	(0 2 0 4 mg) (1/300 1/150 gr
g n U S P (Dilut bef	an 0 2 and 0 4 mg amp (1/300 and 1/150	mg (1/50 g)	mg by 0 2 0 4 mg q 4 6 h s w til 1 2 m i	d tion 14 21 d	mg (1/1200 1/300 g)
D g in U S P B P (Dilut bef)	1 mp le 0 5 mg (1/120 gr)	1 5 mg (3) (1/40 gr)	1 mg (2 (1 gr s mg (1) (1/120 gr) in 3 4 hours th n 0 25 mg (0 5) (1/240 gr) q 3 4 hou until ffe t is btain d	du tion 3 6 day	mg (0 5 1 5) (1/240 1/80 g)
Digitali U S P B P	0 03 0 06 and 0 1 Gm t bl ts (1/2 1 and 1 1/2 gr)	1 0 1 5 Gm (15 22 1/2 gr)	0 6 Gm (10 gr) t on 0 4 Gm (6 gr) 1 6 8 hou 0 2 Gm (3 gr) q 8 h f 2 3 d th 0 1 Gm (1 1/2 g) b i d til ff ct i obt i d t	6 8 hou dur tion 18 21 d y	0 05 0 2 Gm (3/4 3 0 gr)
igit i S P	0 1 and 0 2 mg t bl t (1/600 1/300 gr)	1 2 mg (1/50 gr)	0 6 mg (/100 g) t on and pe t in 12 hou and th 0 2 mg (1/320 g) b i d til ff ct i bt i d	6 8 hou d ation 14 21 d	0 05 0 2 mg (1/1200 1/300 gr)
go in S P B P	0 25 1 0 mg t bl ts (1/240 1/120 and 1/60	2 3 mg (1/30 1/20 g)	1 mg (6 g t q 0 5 0 75 mg (1/120 1/80 g) q 6 h s T 1 3 m 1/20	dur tion 2 6 d	mg (1/400 1/120 gr)
Lanato d C N F (C dil id®)	0 5 mg tabl t (1/120 gr)	7 mg	3 5 mg (0 g) t 1 mg in 6 h th 0 5 mg q 6 h until ff t i bt in d		0 5 2 5 mg (1/120 1/25 g)

0 25 mg (/240 gr) abl t only i il bl in U S

schedule is ma ntained If highe blood l els a e de ired th ind id al dose m st be increas d o the int val be tw do es hortened

Beca e of th fa t that 30 40% of the p ak blood l el of quinidin is st ll pr ent in the rum 12 ho s f llowing r p ted d s of quinidine a fix d dosage sch dul uch as 0 4 Gm (6 gr) ery 2 ho for 5 dos can be r pe t d for sev al days to p od ce i cr a i g concentratio of quinidin in th blood

U

W dely diff e t opini ns have been xp es d by v r us rdiologist on the indications dosages and dangers of th us of q inidin It m t be rem mber d that p t ts in whom quin di has b e sed h o gani a dia dis ase p edi tabl c dent oc ur ven wh q inidin i not giv n to th e i divid als U til ec ntly no s t f cto y m thod f blood q inidin d te minati h s b en av il ble the apy th efo e wa oft n o an a bitrary ather than a quantitati e ba s

A Ind atio s
1 Vent ul r tachycardia
2 Con r ion f atrial f b ill tion t s s hythm Most diol gists fe l that the p es n e of mark d ca diac f il s o org hea t di as d cti e rh um tic f ver c t i di at th us f quinidine
3 At l fl tt if digitali f ls to p du e sinus hythm
4 P y mal at al a d odal tachyc dia
5 Pr enti of r r t p oxy m l rhythmias
6 S pp e sion of f eq t p emat e b ts pec lly follow g myocardial infa ction p stope t t t t
B C tr d tio
1 Idi yn sy a manif ted by f p pu a ash o s ere hypot n ion follow ng th t t do e of 0 1 G n
2 Compl t h art blo k } R l t
3 Bundl b anch bl ck } ontr ind at s
4 Thy t xico is
5 Ac t rh um tic fev
6 S b te bact rial ndoc rditis

R t s f Adm t atio
A O l (Qui d Sulf t , U S P , B P) Thi is the o t f ho e pt wh p e teral quinidine s p fi lly indi cat d (S pag 203 fo d g)
B Pa nt ral
1 I t mus ula p pa ti ns Th int m c la p ep ti an be us d if th p ti nt i un ble t tak th m di a t on ally and the it at on not tical
Quinidin Gl t N F 0 8 Gm (12 gr) in 10 cc mpul s
b 20% Quinidine Sulf t U S P B P in p opyl glycol
15% Quinidin hydro hl id di sol ed in u and tipyrine
2 I t a e s p epa tion An t ve ou pr par tion h uld be ed o ly when gr t g cy qui e t a d only by

and no dose will fit all patients The patient should be in structed regarding the early toxic symptoms when they occur the drug should be stopped for one day and the patient then given the average maintenance dose

B Partially Treated Cases If a digitalis preparation has been taken within 2 week g ve 1/4 of the estimated digitalizing dose and then give additional digitalis cautiously observing patient s response

M int a ce D s and Methods

The oral route is preferred in maintaining digitalizati n The exact maintenance dose m st be determined clinically for each patient (The table on page 199 gives the average doses)

QUINIDINE

Q inidine is a val able dr g in the ma agement of most c rdiac ar hythm as Quin ne may be used but is o ly about 30% a effec tive as quinid ne Only quinid ne will be d uss d here

Pharmacology

A Action Knowledge of the pharmacological effects of quinidine is important in o der to understand the se of the drug Quini dine has a variety of a t ons

1 It increases the refractory p riod of c rdiac muscle
2 It l ws the rate of atrial and ventricular conduction
3 It decreas s the e tability of the myocardium
4 It redu es v gal tone
5 It is a gene al dep essant to smooth muscle

As far as conversion of at ial f brillatio is o cerned sever l of th se pharm ologic l actions oppose each oth r the clinical effe t depends on which of the e actio s predom inates

B Clini al Pharma ology

1 Ro te Can b sed orally I M or I V as occasion demands The I V route should be used only by th s ex perienced in th se of the drug and n u gent sit ti ns
2 Absorption O ally quinidine is ap dly abso bed e ches a p ak l vel in about 2 hours and i relati ely slowly ex cret d Th re is a slow d reme t to abo t 30% of th peak level after 12 hours
3 Excretion a d fate Only 10 20% of o ally administer d quinidine is xcr ted n the u ine the emainde is m t b olized in the body
4 Dose per d y Aft the s me do of the d ug is continued for 5 or 6 d ses at 2 h r intervals no signif ca t rise in blood level o c rs w th furth r doses t the ame int rval
5 Cumulati e ff ct When a fix d dose of quinidine is gi e 4 times a d y as in a maint an d sched le the blood level rises p ogressiv ly but mo e slowly r aching a max imum in abo t 48 to 72 ho rs Th midday blood level then remain more or less the same s lo g as this me d se

C If th patient has atrial f brillation or atrial flutter complet digitali atio is advis d to low the v tricul r rate and to im pr v cardia fun tion If digitalis is not ed the decre sed A V d ctio r ulti g fr m quinidine may ca e a is in ve tri ula rate of 30 50 b ats p minute and may fo ce es t on f quin dine therapy

D If cardiac fail e is p es t in a pati nt w th chron ar hyth mia wh re imm di te on si n is not e ential addit onal m s es (sodi m est icti n m c ial diur tics etc) hould be sed prior to q inidi the apy A period of compl te am bulatory status foll wing the t e tm nt of c rdiac f il is also advis ble to decre se the l kel hood of v ous thrombosis Anticoagulant may b des rable f r a week pri r to quinidine

E A ti f tory method of qu nidin administ at n is a follows 0 4 Gm (6 g) ev ry 2 ho s for 5 6 d ses on the f r t day Thi prod an ve g blood le l of 6 7 mg /L E h s c ding do prod c s p ogr s ly sm lle increment in the blood lev l and, if onv sion do n t o ur after 5 6 d s a high do of the drug m st be i stituted If the sit ti n is rg nt this may b sta ted ft r the f fth do e or one a wait until th n xt mo ing and sta t the dos with 0 6 Gm (9 g) ery 2 h u s G i g the drug m re f eq tly than ery 2 hours do not permit the pe k eff t of th p e ceding dos to be r a h d In mo t ca es 0 6 Gm (9 g) every 2 h urs for 5 do es will onv rt the a rhythm a to sin s rhythm If n t high do an be u ed if no toxi ity h s been e ounter d and it i urge t to o v rt the rhythm s Eighty pe c t of th su s f l onversio s oc ur with daily d es of 3 Gm (45 g) o l s If do es greate th thus sr us d su s f l on rs n will b l s lik lv a d toxicity g eate l e ng qui id e eff ct c b mi qu nt t d by

1 Prog ss e inc s in blood qui idine l el
2 Det m i g th at of the f b ll t o w ve b t obt i ed by V_1 the right prec dial l d n th el t o d og am The atr al ate sl wed ma kedly i at ial fib illation s the t app oa he 200 250/m n onv rs on is n r
3 M as me t of the Q T inte val a d QRS comple As thes mea urement in rea e up to 25 30% abo th i tial v l s ign fic t q in d e ff ts n b p d t d

NITRITES

The nit it s a t by l x ng the smooth mus le especially of th o o y art ri d also of the oth smaller blood v sel s g a f ll in blood p es r Th rapid cting nitrites r us f l angin p to i slow ti g drug m y b efit a few sel ct d as f hype t si n d m y o a onally b of us in pati ts with f qu nt bo ts f angin

physician familiar with the use of the drug Quinidine Gluconate N F 0 8 Gm (12 gr) in 10 cc ampules can be diluted with 50 100 cc 5% glucose and given slowly I V at 1 cc per minute

Toxicity

A Idiosyncrasy See page 201

B Toxic Effect

1 The myocardial toxicity is the most important and should be specifically looked for when quinidine is used The earliest effects are seen electrocardiographically

a Prolongation of the Q T interval

b Prolongation of the QRS interval

c Ventricular premature beats or ventricul r tachycardia

2 *Nausea* vomiting and diarrhea These are rarely critical but may be sufficiently severe to require cessation of the drug

3 Cinchonism Tinnitus vertigo and headache are usually mild but may be important enough to require stopping the drug

CAUTION When the QRS interval becomes more than 50% wider than that seen before treatment or when runs of ventricular premature beats or ventricular tachycardia occur quinidine should be stopped immediately In patients with atrial fibrillation who are onverted with quinidin transient S A block may occur at the time of conversion and nod l rhythm m y be temporarily noted This has not proved to be of clinical signific nce In ery rare inst nces ve tricular tachycardia may progr ss to v ntricular f brillatio and sudden death Prolo g t on of the P R interval is occasionally seen for a short tim when sinus rhythm follows quinidine conversion of at ial fibrillation This is rarely serious and usually subsides spontaneously as the sm ller maintenance doses of quinidine are employed

4 Other cardiovascular ffects

a Hypotension may occur when l rge doses of q inidine are used or if the drug is given parent rally It rarely is signifi ant with o dinary oral do

b Embolic ph nome a Emboli oc ur in ab ut 1% of p tients with chron c atrial f brillation converted with quinidine Th inc d nce is higher in untreat d at ial fibrillation in fact atrial fibrill tion with freq nt emboli is an important reason to att mpt conversion to sinus hythm Anticoagulants are advised for 1 2 weeks prior to conversion in these a es to prevent the developm nt of new th ombi in the at ia The hazard of emboli with quinidine h s been exaggerated but must be appreciated and reg rded as a cal ulated ri k

Procedur fo Con rsio of an Arrhythmia to i s Rhythm

A The patie t should be under con tant obse atio pr fe ably i the hospital wh re frequent examination apical cardiac ates and el ctrocardi grams may be t ken

B A test dose of 0 1 Gm (1 1/2 gr) has been t aditi nally sed to exclude possible idiosyncrasies Wait 2 hours

u p ially f the p t ent on a low sod m diet inc thes g t may cause od m depl tion o hypo hlor mic alkalosi (s e page 187)

P r nt al Pr par tions

1 M u phylline Injecti n U S P (M cuza thin®) 1 2 cc I V s n ed d
2 Mersalyl and Theophyllin Inject on U S P Inj tion of Mersalyl B P (Saly ga Theophyllin ®) 1 2 c I V as d d
3 M all id I j tion U S P (M uhydrin®) 1 I V o I M s need d
4 Me c ptomer n Sod um U S P (Thi meri Sod um®) p plied as dry powder in vial 1 4 Gm (21 gr) in 10 c ial 4 2 Gm (63 g) in 30 al Add dist lled water to b ing t p per v lum a d r f ig r te Give 0 5 to 2 cc s bc t as ne ded M y also us I M

Or l Pr pa t on

Alth gh th o al p epa tion are not fully evaluat d and m y b atic in thei ti th u e may at tim be w ranted Se e I r e tly ava l ble

1 M all id Inj tion U S P (Mer uhydrin®) with A o bi Ac d U S P 1 2 t blets after very m al
2 Chl rm od n N N D (N ohyd n®) 18 3 mg (10 mg Hg) 1 tabl t or more daily s n eded

OTHER DIURETICS

1 Ammoni m Chl ide U S P B P 4 6 Gm (60 90 gr) d ily fo 3 4 day followed by a r st period of s mila d tion Us ful al o as a pot ntiating ag t fo the ction of m c is
C bon anhyd a h b to A ta l m de N N D (D mox®) 250 500 mg (4 7 1/2 g) d y 2 to 3 day w ek f p t ula v l i h o pi tory ac dosi
3 Chl oth id (D[illegible]l®) 250 mg (4 g) 3 r 4 t mes da ly a w pot t l d t Th ava labl d ta a e sc ty b t th d ug ppe to be a p t t a th mer l p du g od m d sis

PROCAINAMIDE HYDROCHLORIDE U S P (PRONESTYL®)

P o amid d p s topi p m k s p v ts a hyth mia unde cy l p p a sthe ia followi g epi ph d i ful i th t tm t of odal and v t i ula a hythmia To a les d g e t b ed to p v t th ar hythmias It h s n h l p t t eff t o the at i l th n n th v tri ul ar hythmi Clini l xp ie e i still too limit d to state wh the p oc i m d qui din ia th dr g f hoi e in the ve tricula hythmi s

Nitrite Preparations

Preparations and Dose	How Administered	Speed of Acti n and Durat on
Amyl Nitrite U S P B P Pearl contains 0 2 cc (3 ♏)	Break pearl in cloth inhale p r n	Onset 10 sec Lasts 5 10 min
Glyceryl Trinitrate Tablets U S P B P (Nitroglycerin) 0 3 0 6 mg (1/200 1/100 gr)	1 tablet placed under tongue p r n	Onset 1 2 min Lasts 15 40 min
Pentaerythritol Tetranitrate N N D (Peritrate®) 10 mg (1/6 gr) tablets	Orally every 4 6 hours before meals	Onset 15 30 min Lasts 4 6 hours
Sodium N trite U S P B P 30 60 mg (1/2 1 gr)	Orally every 3 4 hours	Onset 5 10 min Lasts 1 2 hours
Erythrityl Tetran trate Tablets N F 15 30 60 mg (1/4 1/2 1 gr)	Orally every 4 6 hours	Onset 15 20 min Lasts 3 hours
Mannitol Hexanitrate Tablets N N D 15 60 mg (1/4 1 gr)	Orally every 4 6 hours	Onset 15 30 min Lasts 4 6 hours

XANTHINES

Rec nt studies with ardiac catheteri ati n and metaboli bal ance studies have demonstrated that nt a enous xanthines n re s the card c output incre se re al blood flow and glomerul r f ltra *tion rate* and enhance the excretion of sodium and water they th re fore may b valuable in the treatment of c rdia failure In addition they have be n shown to increase the coronary blood flow wh n sed *in large doses and may on occasion be helpful in angina pectoris*

Preparations

A Oral A var ety of official pr par tions are avail ble b t a satisfactory on is Aminophylline U S P B P (enteri coated) 0 1 0 2 Gm (1½ 3 gr) 4 6 times p r day

B Par nt ral Aminophylline I je tion U S P B P 0 25 0 5 Gm (3¾ 7½ gr) I V sl wly ov a 5 m nute per od o 1 M may r peat n 2 4 hours

C Rectal suppositori s conta ing Aminophyllin U S P B P 0 36 0 5 Gm (5 7½ gr) may be valuable in an impending at tack of cardiac asthma or in nocturnal angina pectoris

MERCURIAL DIURETICS

The mercurial diuretics act by reduci g th tub l r reabs rp- *tion of sodium and chloride* They may b used for d ma d e to most *causes except those associated with impaired re al function* They are of great importance in congesti f ilu e A o dex es i e

Chapter 8

DISEASES OF THE BLOOD VESSELS

PERIPHERAL ARTERIAL DISEASE

An important consid ati n in the man gem nt of p t nts with p riph al a ter l dis se s the d t rmin t of (1) th amount of d sab lity du to sp sm and (2) the amount of disability du to occlusion Therapy is aimed in each e at elievi g th s disturbances

Differential Diagnosis of Common Peripheral Vascular Diseases

	R ynaud s D eas (cod N 47x 502)	Th omboang tis Obliter n (code No 40 930)	Art ri leros Obliterans (ode No 460 952)
S x	70 90% fem le	97% mal	Over 75% mal s
Ag at ons t	10 50 y a s	20 35 y	O 40 y ars
E t m ti s inv l d	U ually upp r but may o cu l w	40% upp r o e 98% in lower	Alway l w arely upp r
Symmet y	Symm t al b l t r l	A ymm t i al us lly bilat l	Asymmet al usu lly b l te l
P ph ral art ial pul ati n	P e nt	Absent o d min h d	Abs nt or d minish d
U ual tes of gangr	Sm ll eas t tips of fing s and toes	Var ble	Variabl
V n in *volv ment* (phl biti)	Ab t	*Oft n p e ent*	Ab ent
Cal if t on in arte ies	Abs nt	Rare	U ally p nt

Degrees of Spasm and Occlusion in Peripheral Vascular Diseases

Di	Sp sm	O cl sion
Art io l o is oblite ans	0 to +	+++
Th omboangi tis oblit ans (B g s di)	++	++
R yn ud s d a	+++	0 to +
A ut t i l mbol m	+++	+++

Dosage and Administration

A. Oral Pr par t on (250 mg capsul s) 0 25 to 1 Gm (4 15 gr) orally every 4 6 hou s is the recommended do e

B. Intramuscular Preparation (1 Gm ampules in 10 cc dil ent) The peak effect occurs within 15 60 minutes a d a sign f ca t blood level is still present after 6 hou s The blood level is higher and the decrease is slower in patie ts with cong stive failure and renal insufficiency Hypotension is infreq e t with the intramuscular use of the drug in the above dosage

C. Int aveno s Preparation (1 Gm amp les in 10 c dil ent) Can be used for ventricular tachycardia of a severe or u gent nature The drug should be given very slowly 50 100 mg ($^{3}/_{4}$ $1^{1}/_{2}$ gr) per minute up to a dose of 1 Gm (15 gr) with continuous blood pressure and if possible electrocardi graphic control

Toxicity

The same preca tionary methods outlin d in the sections deal ing with quinidine are esse tial when procainamid i being used

A. Seve e Hypot nsion This is oted particularly with the par ente al use of pr cainamide and may b se ere enough to re quire cessation of the drug This is why frequent blood p es sure demonstrations are necessary while the dr g is being given

B. *Co duct o D fects* *Prolo gation* of the QRS int r al may occur as with q inidi e

C. Ventricular a rhythmias may o ur as with quin dine

A G e l M u

1 Cor e t any diso de (e g ng stiv fa l r) wh h may interfere with th blood supply
2 D ab tes if p esent m st b vig rou ly ont olled
3 T bac o in any f rm should p b bly be p h b ted but th e no compl te agre ment n this point xc pt in thromb angiit oblit an or Bu ger s d s s where t eatm nt is us l in th pati nt wh contin s to sm ke
4 Al hol c bev ag in mod at on ar not ont ai dic ted
5 A w ll balan ed nut it ou d t should be m intain d
6 Adequat r t and rela ation void fatigue

B Loc l M es

1 Avo d xtr mes of h t and c ld do not us contrast b ths
2 F ngous nfe t o s f the fe t mu t b controll d Fu gi cidal dye s l t o (g Cast lla s) m y be s d A o d us ng Whitfi ld s intment (e pag 89)
3 Inf tion of and t aum to the ff t d xt emity must be guard d gai t Th p t nt sho ld be giv n th following inst uct ns
   S ak f et f r 10 15 m nute in warm wat (*not hot water*) bef e tt ng n ls
   b Bun ons o co ns m t b t imm d by phys an o a ch op d st
   c Sk n must b kept ft and pliant by rubb ng w th lan l n o a bland v g t bl oil 1 2 t mes da ly
   d Socks ho ld be hang d at least on a d y Fo warmth u oft wo len socks 2 pai f anoth r kind
   Shoes must be well f tt d a d h p su e p int

C Sp i l M a Th f llow g may be s d in an tt mpt to inc as ll t l l tion

1 B g ex m y be f val How v do not if an infect n o op n wound pr s nt I d vidual the r e f h pat t Demonstrati and r h r l re f gr t mpo tai
   El te leg ab ut 45 d gre (s ppo t th m n inv rt d h o the w ll) nt l bl hing or pain o s (u lly n l min tes o l)
   b Next all w the l g to d gl fr ly fo 2 5 minutes until maxim l r b o s At th me time the fe t are mov d d w wa d and upward nd th n nw rd and tward Th toes a sp ad a d lo d while th m v m t ar b ing made Do h of f ot e i s 10 tim If th f t t o p inf l t may b n ce s ry to limin t th s
   Th pl l g d b dy in ho izontal pos ti n for 2 min t
   d R p t th mplet tin 5 t m t ach ss and ha 3 5 s s ions d ily
2 M hani l d vi m y b s d b t it p bable that the o ly ff ti e d vi i the o ll t g b d
3 V odil to d gs (page 211) The e ar u ally of litt o o v l and unl s th e is bn rmal va o onst ict on m y tually be ha mful Blood flow studi how a d c eas i th blood supply to th is h mic limbs f th lde ly ar t o cle ti t the height of y t mic vasodilat ti n d to drug

Differentiation of Spasm and Occlusion

	Spasm	Occlusion
Color	Livid cyanosis	Blanched
Moisture	W t	Dry
Veins	Constricted	Full d lat d
T mper ture	Cold	Cold
R action to vasod l ting tests	Extremity becomes warm	Extr mity rema ns cold

Adequate differentiatio can usually be made on the basis of the first 3 of the above facto s Peripheral art rial d s ase usu lly is a mixture of spasm and occlusion but in many cas s one factor is more prominent than the oth r Therapy is aimed at correcting the physiologi al abno malities whenever poss ble

T st for D gree of Arterial Oc l sio

A simple techn c for ev luating the degr e of arterial oc lusion in the lower e tremities e pecially the foot is th r acti hyper emia a d el vation t st The test is parti ularly us ful i evaluating tr atment and in d termining the p ognosis f ul er of the f ot

A Te hn c

1 The patient is plac d supine and the b achial blood pressure *taken*

2 The toes are raised to 65 cm above the at ial lev l and ob erved for blanch ng [Th atrial le el is taken at 7 cm below the junct on of th man brium a d th body of the sternum (angle of Lou s)]

3 If no blanching o rs the fe t remain ele t d and bl od pressure cuffs are inflated just above th ankles to a p es sure 50 cm above brachi l systolic pr ssure The oc lusi cuffs are left on fo 5 min tes

4 At the end of that time with the feet still elev ted the p e sure in th cuffs is suddenly released and the feet obs r ed *for return of olor*

5 If at the end of 1 minute color has not returned the foot is lowered 5 m and then lowered 5 cm e ery 30 seconds un til olor returns The lev l t which color r tu ns is oted

B Interp et ti n

1 If the f lling pre sur (level at whi h col r returns) is 35 cm *or more abov the auri le spontaneous healing of an* ulc r will occur or if amputation is n cessary thr gh the foot the amputation site will heal

2 If the filling pressure i u d r 35 cm the more exte si e procedures (g symp th ct my endarter ctomy) or drug th rapy must be don to help raise th pressure

CHRONIC OCCLUSIVE ARTERIAL DISEASE
(Usually Arteriosclerosis)

Tr tme t

Prim rily conservative b t thrombo ndarte ectomy v sc la grafts and sympath ctomy are of in *timable value in the properly* selected case

Crite ia for sympathe tomy B st determined on linical g o nds assist d by vas d lator t st

(1) Clini al vid nce of incr s d vasomoto tone This is viden d by sw ting cyanosis and const icted veins (abs n of sev rubor and no mal o slow blan hing r ction on levation)

(2) Symp th t block o m l test gi s rel f f pain and inte mitt nt claudi ation and bett r olor to feet

b C t aindi tions

(1) M ked rub on d pendency

(2) Rap d blanching on el v tion

(3) At ophy of tissu

Vasodilato drugs

a Chem l symp th ct my The int oduct of gangli c bl king ag rt has affo d d a new pproa h to th el f of abn rm l va o n tri t Many h ve b n tri d but only few are u ful

(1) Ad nergic blocking gents Th s drug ct t th n v nding in th v scul r mu cl ell (eu o ff tor te) whi h is prob bly the m st desirable mod of action They thus n t only block the sympa th tic v oconst icto timuli b t also the v o o tr cto eff ts fr m circ lating epinephrine and nor ep ph ine Thi g o p of drug in l des Tolaz li e Hyd o hlor d U S P (P iscoline®) ph oxybe m (D b yl e®) Az p t Ph sphate N N D (Il d ®) and Nyl d in Hydr hlo d N N D (Ar l din®) (t bl) Thes drug ar ffect v o ally They ar th mo t us f l d g i unte act g ab mal vaso p sm

S d effe ts wh h a t ble om b t ot s r o m y b a al g t m s p kly s ation of calp Weak ss d zin s a d fat gu r lated to a mode at po t r l hypot nsion this may be co re ted by a d r in do age O rd age may e s lt i a m p f und po t r l hypot ns on with faintn s r y pe The drugs ho ld be d with aut on in y patie t who g v a history of asthma o p pti ulce Th y may b g n t a ve sly or t art ially (ra lv ary)

D g	How S pplied	Do g
T laz lin HCl U S P (P i lin ®)	25 mg tabl t	St rt w th 1/2 tabl t t d p c and g d ally in e to 4 8 t blet da ly
Ph o yb min HCl N N D (Dib li ®)	10 mg ps les	Start w th 2 ap ul daily p d i by 1 e ery 4 day up to 4 6 ps le daily
Az pe in Pho phat N N D (Ilid r®)	25 mg t bl ts	Sta t w th 1 t bl t t d p fo 1 w k 2 t bl t t i d fo the 2 d w k th may in eas t a maximum of 2 tablet q i d
Nylidri HCl N N D (Arlid ®)	6 mg tablet	S t w th 1 tabl t t d p and inc as grad ally to 1 tabl t 4 6 times daily

D Treatment of the Severe Stages of Peripheral Arterial Decompensation
1 Treatment of claudication
a Teach patient to walk slowly take short steps and to stop to rest before the pain of claudication is fully developed
b Correct any ligamentous or arthritic disabilities stretching exercises salicylates
2 Treatment of rest pain
a Have patient sleep with th head of his bed elevated 8 10 inches
b Limit activities rigidly
c If edema has d veloped, an oscillating bed or Buerger s exer ises may be prescribed (see page 209)
3 Treatment of severe infection or incipi nt gangrene
a Start antibiotics as soon as infection occurs (see page 514)
b Keep extremity horizontal or lowered never el vated The oscillating bed may be useful
c Keep the foot free of dressings
d Room temperature must be comfortable (70° 80° F)
e Support bed clothes by use of a cradle over affected limb or by a pillow under bedclothes at the foot of the bed
f Drain purulent pockets tho oughly but gently This may be accomplished by covering crusted lesion with a few layers of Vaseline® or Xeroform® g uze for 24 hours then applying saline spong s at room t mperature and changing frequently during the next 48 hours Then dress the lesion with a bacit acin or bacitracin ne my in oint m nt and a single layer of Xeroform® gauze for 2 3 days Reinstitute this treatm nt when nec ssary

E Surgical Measur s
1 Thrombo endarterectomy is especi lly u eful in the segmental or localized occlusion of major arteries
2 Sympathectomy if there is some evidence of abno mally increased vasomotor ton (see page 208)
3 Conservative amputation (toe or transmetatarsal) when e acti e hyperemia and elevation test shows a filling pressure in the small blood vessels of 35 cm or more (see page 08)
4 Class cal supracondylar amputation if filling pressure in small blood v ssels by reactive hyperemia test is less than 35 cm and thrombo endart r ctomy or sympathectomy is not indi ated

VASCULAR SPASM

Tr atment
A General Meas es Th same as for occlusive diseas However *tobacco in any form must be strictly prohibited*
B Local Measures Th sam as for occlusive diseas e pecially *if associated occlusion is present*
C *Measures* aimed at prolonged or permanent r lief of spasm
1 *Surgery* Sympathectomy of the aff cted xtr mity is usually *the treatm nt of choice*

Crit ia for sympathectomy Best d termined on clinical grounds ass sted by v sodilator t sts

(1) Clinical evid n e of incr sed vas motor tone Thi is evid nced by weating cyanosis and constricted eins (absence of ever ubor and normal or slow blanching rea ti n n elev tion)

(2) Sympath ti block imila te t giv elief f pain and i termitt t claudi ation and better olor to feet

b Co t aindi ations

(1) Mark d ubor on dep nde cy

( ) R p d blan hing on lev tion

(3) At ophy of t ues

Vasodilator d gs

a Chem al symp th ct my The int oduction of ganglio i bl cki g g nts has afford d a n w pproa h to the reli f of b orm l aso st tion Many ha e b n tri d b t only a f w s usef l

(1) Adr gic blocking ag nt These dr gs ct at the n ve ndings in th va cul r muscle ells (n uro ff ct r s te) whi h s probably the most desi abl mode f act on They thus n t only blo k the sympa th ti v soco trict r stimul b t al o the vaso on str tor ffects f om ircul ting epin phrin and o pi eph ine Th s gro p of d ugs i cl d s Tolazoline Hyd ochlorid U S P (P is ol n ®) ph o ybe za m (D b zyl e®) Azap ti Phosphate N N D (Ilid ®) nd Nyl d Hyd ochl rid N N D (Ar lidin®) (e t ble) Th drugs a e eff tiv ally Th y a the most ef l drug unte a ting ab m l o p m

S de ffe t wh h a tro bles m but t s iou may b al co geat m s p ckly s n atio of ac lp W ak s d zin ss a d fatigue a e r lated to a m de te po tur l hyp t sion this may b e r ted by a d e in do ag Ove dos g m y e s lt i m p fo d post l hypoten o w th fai tn ss y p Th drug hould be used with c ut a y p t t who g ves a h st y of thm o p pt lce Th y m y be g e i t a enou ly o i t a terially (ly c ry)

D ug	H w suppl d	Dosage
T laz lin HCl U S P (P i l n ®)	25 mg tabl ts	Start w th 1/2 tabl t t d p and gr dually e to 4 8 t bl t daily
Ph oxyb n min HCl N N D (D ben yli ®)	10 mg ps l	St t w th 2 p l d ily p and in a by l e y 4 d ys up to 4 6 c psules da ly
Az pe in Ph phat N N D (Ilid ®)	25 mg tabl t	St rt w th l t bl t t d p f r l w k 2 t bl t t i d for the 2nd w k the m y e s to a m xim m f 2 tabl t q d
Nyl d HCl N N D (Arlid ®)	6 mg tablet	St t w th l t bl t t d p and i a g d ally t l t blet 4 6 t mes daily

(2) Veratrum viride compounds Produce peripheral vaso dilatation by depressing vasomotor centers in the hind brain They do not block vasoconstricting effects from circulating epinephrine and norepinephrine They are relatively ineffective in a patie t with vascular spasm

(3) Tetraethylammonium ion and methonium compounds Block sympathetic and parasympathetic impulses at ganglionic synapse They do not block vasoconstri t ing effects from epinephrin and norepinephrine and may potentiate va oconstricting responses to epineph rine and norepinephrine

b Direct vasodilators (act directly on vascular muscle) Nitrites nicotinic acid and derivativ s have not proved too successful in pati nts with abnormal vasoconstriction

ACUTE ARTERIAL OCCLUSION
(Acute Arterial Embolism code No 46 618)

Acut arterial occlu ion is usually d e to embolism It ccurs most commonly in patients with a ricular fib ill tion or myocardial infarction but may result from thrombosis of vessel e pecially during periods of hypoten ion

The ons t is frequently sudden and assoc ted with severe pain Constitut onal symptoms and shock are present if the artery s of larg caliber There is pulselessne s of the dist l artery and pal lor and coldn ss of th extremity with numbn ss tingling and muscle p es s If t atme t is not inst t ted th xtremity or part may und rgo gang nous change

T atment

A Su g cal Immed te embolectomy is the t eatme t f hoic

B G ne al Mes re To ombat th th omboti extensi n of the mb l s and reflex va pasm institute the followi g m sures at on e and continue postoperativ ly (r u e if su gical tre t me t is not possible)

1 Morphine s lfat 10 15 mg (1/6 1/4 g) I V t once and repeat as n eded sub utaneo sly

2 Antico gul nt ther py should be institut d t once to prevent thromboti exte sion of th embolus Give Heparin Sodium U S P B P 2 cc (20 mg) (2000 unit) I V immediately The effects of this hep rin will us ally have w rn off by th tim th p tient has b e transport d to a hosp tal or pre par d for operative tre tm nt The us al regimen of anti coagulant therapy is th n started as soon a possible (s e pag 215)

3 Procaine o xylocaine block of the sympath ti s to the af fected extr mity m y be h lpful R pe t as ne essary but use c utiously in the patient who h ei ed antico gulant th r py

4 V odilator and sedatives

a Papa rine Hyd ochl ride U S P B P 30 60 mg (1/2 1 gr) I V ry 2 3 hours

b Ethyl alcohol (as alcoholic bev age) orally in g nerous amount

Ad energic blocking agent (See page 211)

5 O illating bed Usef l in acute occlusions

C L cal M su es

1 K ep extrem ty hor ontal o slightly d pr ssed if an o cil lating bed is not av ilable prote t against pre sur or tra ma

2 Avoid use f h t or old to the aff cted part

D T e tm nt of I chemic Neuriti May foll w a ute rte ial clu on

1 Cyanoc bal min U S P (vitamin B_{12}) 1000 mcg hypo de mic lly d ly f 2 weeks has been ad oc ted

2 Art ie tomy will give relief if Vit min B_{12} ther py does not h lp but r st blishment of c rculat on by th ombo ndart r ctomy is p ef red

DISEASES OF THE AORTA

AORTIC ANEURYSM
(Syphilitic code No 461 147 6)
(Arteriosclerotic code No 461 942 6)

A t ue neu ysm is a puls ting c which f rm a th esult of dilat tion of th w ll of an rt y Th s in th p im l p rt of the o t pe i lly the ch are most f eq ntly lu tic Thos fa th r d tal ar omm nly rt ios le oti

Th sig a d symptom v y with th lo ti n and iz of the an ury m M st f equ tly they are due t local p s ure l s freq ently t ptur The m t omm n sympt m is pain which r ult from p sure on su ro ndi g stru t Pr ssur on t u tur bout th ort ar h lso f q ntly c u es dysp ea and ugh Abdomin l ao tic an u ysm may produ b k fl k or gr in pain Som an u y m m y be symptomati and m y be d s ver d by physi l x mi t on or by x y of hest or abd m n

T tm t

A Sp if M r T at und lying syphil s if p s nt (s e page 440)

B Su g l

1 R pl m t f th weak ed wall by an autoge o v in- unlay g aft h m logous art ial gr ft r Vinyon® o Orl ® loth p th s is th p ef ed p r tive t eatme t

2 P lli ti Attempts t h lt furthe dilatation by producing an int nal th ombu long th wall f th s c o by ext r n l co n ti ti s e f m t o ar p lli ti e p o edur to be us d only in the po risk p ti nt

DISSECTING ANEURYSM OF AORTA (code No 461 940 1)

D s cting an ry m i a d by the rupt of th intima and fo f i p ti of th ts of th ao t in the pres n e of hyp t ion It ually e c d y to a t io cl otic changes in th a ta

It is manifested by a sudd n onset of sever agon zing pain usually in or near the site of the rupture The pain may radiate t the head back *pelvis or legs Shock follows rap dly* and death usually occurs in a few hours or days Di gnos s is usually made at autopsy because of the clinical similarity to myoca dial infar tion and acute arterial occlusion

Treatment

Tr atm nt is entirely symptomatic and similar to that of myo cardial infarction (see page 165) S gery has been u ed suc ess fully in a few cases

DISEASES OF THE VEINS

VENOUS THROMBOSIS (code No 48 619)
THROMBOPHLEBITIS (code No 48 100 7)

A c nd t on of un rtain etiology in which a thrombus forms in a small vein (us ally the lower part of the leg) and grows by depos tion of fib in and cells filling the larger v ins of the leg (98% of cases) Inflammation of a local z d area or much of th vein m y be present Early in the dise e the hief dang r lies in the de tachment of all or pa t of the thromb s prod ing pulmon y in farction Years lat r the hief dang r lies n th devel pm nt of th post phl bitic l g with edem sub utan s f br s s nd ulc ration

This cond tion is common in both medi l d su gical p tie ts Th pres nt m dical and surgi al t tment meth ds m y po ibly be of v lue but l ave mu h to b de ired

Diagnosis

E rly diagnos and mm diate ther py are of im t mpo t nc to pr v nt pulmona y inf t on

- A History Ven us thrombosi te ds to oc ur ft r abdominal o p i i surg y trauma pr l ged bed st and ab mal gnan ie
  1. P in in calf and b hind kne s impo ta t s d e ly symp tom
  2. Pleu t p in f sudden ns t with bloody sputum s h ghly ggestive of pulmonary inf rct on
- B Phy ical Ex min tion M y be n gativ
  1. Ea l t signs a
     - a Diff ren in c lor of fe t w th lev t n
     - b Sl ght difference in t mperature
     - c Dilat tion of upe fi ial in of l g
  2. Pain or te de es on p lp ti o m in venous hann ls f alf or foot *Do not palpate t o vig r u ly*
  3. Homans s gn L mitati n f m t o o ti do siflex on of foot
  4. Swell ng of the calf Us ally late ign May b d t min d only by me su ment a d comparison with the oppo site limb or by epeat d m r me t
  5. Examination of the ch st in ca of uspe t d pulmon ry infar t on may re al an a a of dimini hed b th s und crepitant rales or pl ur l f iction rub

Tr tm t

A A ti oagulant Th apy As soon as the diagn i of venous thr mbos is m d ant coagulant ther py must be start d at once *Prothrombin level and Lee-White clotting time must be determined first*

1 Hepar n Prolo ged anticoagulant action of h parin m y be obtained by the d po ition of a h ghly con trat d solution of ystall ne heparin into a relat v ly comp ct and avas ular a the s bcuta eous fat One injection daily ppears to giv a p olong d anti agulant actio A highly concentrated queous h parin (200 mg per) is inject d slowly through a No 25 n edle int the subcut ous f t 1 2 inches below th po ter or ilia est Aver ge dos are s follows

100 lb pati t 200 mg daily
150 lb pat nt 250 mg d ily
175 200 lb patient 250 300 mg d ly

Check L e Wh te clott ng t me befo e sta ti g treatm t and ju t befor the n t dos If the clotting time e eeds 18 min defer the next dose until it falls below this l vel Modify dos ge as ecess ry

At pr s nt th m t g per l use of hepa in is during the fir t stage o from the first to th thi d days of antico gu lant th py until the al p thrombin depres ants b com ff ctiv The s bcutan ou administ ati n of h p rin m y be us d alone w th ut th addition of prothrombin d pressants

2 P othr mbin dep es a ts During the fi st stag of tr t m t (1 3 day) t i b st to supplem nt th drug with h p rin until prothrombin co entr ti n r h s therapeuti le ls (10 30%) Proth o nbin l ls should be d e d ily and the n t dos not given until th day l l is known

a B shyd oxycoum in U S P (D umarol®) U lly tak s 48 72 h rs to r h ff ctiv ther p ut l v l and th am time to return t norm l fter d scontinuing treatm nt I it l dos is 200 300 mg on the fi st d y 100 200 mg on th econd day Mai t anc d s va i from 25 to 150 mg daily

b Ethyl B coumacetate N N D (Trom xan®) T m an® is aid to ind e a m re pid fall in p thrombin on tration and a more apid r e aft c at on of al administration than Dicum ol® Initial d se is 1500 1800 mg in 2 d vid d dos on the first day and 300 600 mg on the s o d d y Maint anc d s is 300 900 mg daily in divided do es Hep in is u ually only g ven f the fir t 24 hours b cau e of th mor ap d acti of Tr mexan®

c Ph i d n N N D (Hedul ® Da lon ®) Has th adva tag of p d o et d e t n of act on to s d g ee mpa abl w th T m ® I tial do 200 400 mg in 2 divid d dos s Mai t na ce d s s 25 150 mg i d vided dos Vitam K is appa ntly not f f tiv in unt r ting th ffe t of phenind one but this may ot b important in view of the ap d r turn to r m l p thrombin l vels aft withd awi g the drug

d W f in Sod um N N D (Coumadin®) is a hyd oxy u ma in d i tiv which m y b s d o ally or p r nter ally Th d s ge th sam ir e p tiv of the route f

administration The initial dos is 75 mg orally I V or I M The maintenance dose is 5 10 mg daily In duction of prothrombin depression is rapid but th re turn to normal may be prolonged up to 6 days

3 Duration of therapy varies with each case For most pa tients this is about 10 14 days Co tinue the therapy for about 7 days after there is no further fever or pain

4 Treatment of bleeding and ove do age The p incipal dang from anticoagulant therapy is abnormal bleeding

a Bleeding due to excess heparin Discont nui g the therap will usually terminate ble d ng in abo t 1 3 ho s only if I V heparin has been us d If immed ate cessation is necessary slow I V inje tion of protamine sulfate 40-50 mg will neutralize the effect of 50 mg of hepar

b Bleed g due to excess prothrombin depressa is more diff cult to control for the prothrombin l vel ris s slo ly after therapy is discontinued The rise is more ap d when Tromexan® or phenind one has b en employ d

(1) Se ere bleeding

(a) Stop the drug and do not use again

(b) Fresh blood (citrated) t a f sion mmediat ly

(c) Phytonadione U S P (M phyton®) 50 200 mg I V slowly (at rate not ov r 10 mg /m nut by syringe or added to v n clys s f dext ose and/o sal n) and repeat e ery 6 h ur s necessary Th act more rap dly than synth tic v tam K like product (as m nad e b low)

(d) M adio e Sodium B ulfite U S P Gi e 50 100 mg I V Stat and rep t 2 3 tim th fi st day

(2) Mild bleed ng (m ld nas l hem ho dal urinary o zi g)

(a) Stop dr g rest rt at low d sag fter proth m bin tim ris s t 20 30"

(b) Phylon d one U S P (M phyton®) (5 mg r l t blets) 5 30 mg u ually d q te If bl d g is ot troll d or b come m s e us I V s bove

c Overd ag of d p essa ts w tho t bl d ng If the p o thrombin le el d ops bel w 10% a d d s not r 2 day aft r d sc ntin g m di ation give Phyto adio U S P (Mephyton®) 5 30 mg r lly When pr th om bin ses the d ugs m y b gi ga n

B V n L g tion

1 If t oagula t ther py s ontrai d ted V in l g tion is rec mm nded for a y e in wh h t ag lant therapy s tr di ted Th se a s w th pu pu a p n ul s pr e c of d mag t bes ee t m s s of renal o h bat d sea and i ca s p p ring fo C N S u g ry

2 Active th mbu or embolu form t V l gatio ho ld b perf med if th r re g of pr pagat n of th throm bus if embol ontin to occ whil under ant co gulant therapy or if sept phl bit s i p sent

C G l M or P i e t re is in b d with foot el t d 4 6 in hes An elastic ba d g is appli d mugly f om t ot t abo e k e or mid thigh to k ep v na o llap d D not obstru t arterial circulation Ch ck pulses R wrap ry 6 h s

1 Exerci e A soon as t eatment is started allow fr e mo m nt and e r i s in bed (see b low) If leg is in st p tie t m y xe ci e by t nsing and r laxing m scles in ast
2 Ambul tion As soon as th a ut pain sub ides (r if no pain is p e ent as soon as therapy is instit ted) the pat nt mu t be m de mbul to y (nl ss oth r ystemic ond tio s prevent this) During this tim an la tic band g should be w rn The t m out of bed and w lking is increa ed ve y d y Th ela tic b dag should be w rn for about 3 week afte full ambulation has be n chi ved

P ophyla is

A Early Amb lat o nd E r is s

1 E rly ambulation P olong d bed st or inactivity should be vo ded sp cially i elde ly pati nt Hav patient up and abo t as soon s p ss ble aft r ope ation or a ute lln ss Walking a f w st ps s p f rabl to sitt ng f r half a ho r r m in a chair
2 Bed exe ci s If b d re t i ne s ry pass e or acti bed e ci es should be n t tut d as soon s pos ble and should be contin ed as long a patient must rem in in bed The c n ist of act o pa sive fl xi of to s ankl s kne and h p repe t d 5 10 times e y hour while awak
3 Moveme t in b d With pat e ts at b d re t k ep bedclothes loo s patie t n mov l gs f ly
4 Ele ation nd c mp e i Elevation of th foot f the b d 4 6 i ch s and wrapping legs fr m the toe to j t below the k ees w th a band ges will usually promote ve ou return

B Routi P ophylactic Use of A t oagulants In eld rly p t e ts who c nn t pe fo m any f the abo eg m n th se may be of al e (gi a o tli d n p ge 215) b t in gen al the outine p ophyla tic us of ant c agulants not advis d

POSTPHLEBITIC EDEMA AND ULCERATION

Almo t all p tie ts with ute thrombophl b tis of a lowe x t mity de lop the postphl b ti syndr me ev nt ally In de f pp a n a di re si g di b l ty the ha cte stics of thi ynd m a a foll w (1) re an lization of th de p ve n of the low r xt emity w th incompet nt deep valv and edema or s p r fi ial v rice or m re freq ntly both (2) sub uta ou i flam m to y hang (usually n the medial spe t of the low r th rd of the l g) with e tu l sub ut eous fibro is atrophy pigmentation d zema of the o erlying skin and (3) ul rat on

Di gno is

A H to y The m y not be a hi to y of thrombophleb tis but th s lmost alw ys a hi tory of majo s g y fr ctu of the l w r xtr m ty r p lo g d b d t for medical r as s

B Symptom and Signs

1 Edem and ch g t d ss of th l g afte p ol ng d stand i g o itting s a freque t symptom I m y s r l ef i ob ined by el vati n of the xtremity or by walking Congestion and yano is of the skin may be pre nt
2 I rea i g p mi f th s p rf c al v ins

3 Episodes of inflammation of the medial aspect of the lower third of the leg
4 Dry scaling eczema of the lower m dial p rt of the leg
5 Varices of the superficial saphenous system and incompetence of the deep valves usually can be dem nstrated
6 Brownish red pigmentation of the skin just abo e the medial malleolus or less often just below the lateral malleolus
7 Subcutaneous fibrosis with retraction and shrinking of tissues may be very painful and disabling Fibrosis is usually just above the medial malleolus but may girdl the leg
8 Ulceration in areas of subcutaneous fibrosis

Tre tment

The accumulation of protein rich edema fluid is the m in cause of the more serious manif stations of th postphl bitic syndrome If ed ma is conscientiously avoided these may be pr vented

A Co trol Ed m
1 Sleep every night with foot of bed on 4 inch blocks
2 Wear well fitted (made to ord r NOT stock s pply) heavy duty lastic stocking below the kn e with fitt d heel
3 Three to four 20 minute rest periods during the day with feet elevated 6 8 inches above heart l el

B *Control Infe tion Control of dermatophytosi and any homy cosis is essential Castellani s dye to toes and nails once or twice a week i probably the best ontrol me sure*

C *Eczem nd Ulc ation* Once thes signs ppear elastic support is not adeq te A refully fitt d semi igid boot of the Unna s paste boot type will heal m t ulc r in 1 4 months Boots may b appli d with t pe and sheet cott n Vis p te® or Gau tex® The pati nt contin e his ual a ti ti s The e boots should be applied with firm ven pressu e o er the l g without irregularities which may c e f rth r d m g to the skin *They m st be hanged ev ry 1 to 2 w ks d pending on drain ge but once the ul er i he l d or d ain ge i minimal it an be left on as long as 4 to 6 we k*

Viscopaste® band ge is n Unna past type bandag 3½ inches wid impregn ted with gel tin and zinc oxide The Gauztex® bandage s a 3 inch band ge imp egnated with a s lf adhering comp und which i surp isingly non all g nic

The ba d ge sho ld ext d f om the base of the toes include the h el and continu *to a point immediately below the b nd of the knee* A thin layer of cotton she ting or gauze is us d to pad the A h ll s tendon and th dorsum of the foot *An extra l yer of cott n or gau e and s metime a bb r sponge ½ in h thi k is placed ove the ul r* Spe al o ntm nts espe cially ant biotic prep ations a not ne essary Th bandage is started w th one hor ontal t n a ound the foot and when c mplet d it i carried obliquely ov r the h l and th n ba k around the foot Afte the h el has be n ad qu tely cov red the band ge *is c rried p the leg No attempt hould be mad to apply it as a o tin s spi al* It should be allowed to *follow its own course* without pleating and should be ut *freque tly if nece s ry* so that bandaging may be r comm n ed to build up a uniform thickness of paste or band ge whi h should b molded carefully to co form evenly t th shape of the limb

Chapter 9

DISEASES OF THE BLOOD AND LYMPHATIC SYSTEMS

ANEMIAS

HYPOCHROMIC ANEMIA (code No 501 736) (Normocytic and Microcytic)

Hypoch omi anemi s (l w color index and M C H of less than 27 γγ) in lude a emias due to nut itional defi enci infections and to ins and chroni blood loss Wom n req ire about 4 times as mu h iron men up to the menopau e

P th g esis

A Chr ic blood lo

B Inad qu te intake of iron (nut it onal an mia)

C Defe tiv abs rption f iron in the g troint stin l tra t (e g hyp hromi anemia of inf ction) F to s influen ing ab orp tion of iron in l d th foll wi g

1 A corb acid f ilit te th absorption f iron hyd ochlo ac d d es not

2 Depleti of body iron incr ases the abs rption of i n

3 Valen e of iron ingest d (F^{++} is e dily ab orbed F^{+++} is ot)

4 Inf t on c us dec a ed b rption of i n

5 P ot in d f i ncy s s dec ed b rpt on of i on

D Idiop thic mechani ms

E P gnancy

T tm t

A Sp fic M asur

1 C ct ll fa t s using or ont ibut ng t anemia e g h morrhag infe t on dia hea v m ting int tinal p s itism o ult bl ding diaphragmatic h rnia g stric polyp and tumo s

2 I on is pe ific f th s type of an mia It is best g ven imm di t ly aft m ls

a Or l p par tion and d ag (Phy ological eed i 15 mg /d y maximum ab pt on i con id ed to b about 100 mg /d y)

(1) Fe rous Sulf t U S P B P 0 2 0 3 Gm (3 5 gr) t i d. p

(2) F us S lf t Sy up U S P (0 12 Gm 2 gr pe tsp) 4 8 c (1 2 dr) b i d or t d p c

SIZE COLOR RELATIONSHIPS OF RED BLOOD CELLS IN THE VARIOUS ANEMIAS

SIZE	COLOR		
	HYPOCHROMIC M C H < 21 γγ C I < 0 9	NORMOCHROMIC M C H 27 32 γγ C I 0 9 1 1	HYPERCHROMIC M C H > 30 γγ C I > 1 1
MICROCYTIC M C V < 78 c μ V I < 0 9	An mias du to f ulty GI absorption of iron Iron deficiency anemias Anemias du to infections Anemias du to chemical and physi al t xins Spl nic an m a E yth bla ti an mia	Uncommon	Uncommon
NORMOCYTIC M C V 80 94 c μ V I 0 9 1 1	Anemias du to blood los Hemolytic anemias Erythrobl stic anemias Myelophthi i anemia	As for hypochromic microcytic and n rmocytic anemia Apla tic anemias	Uncommon
MACROCYTIC M C V > 95 c μ V I > 1 1	Macrocyti anemias complic t d by iron deficien y or blood loss o other of the above f ctors	As fo hyperchr mic ma rocytic anemias	Pernicious anemia Tropi al anemias Anemia of prue Fish tapewo m anemia Macrocytic anemias associat d with Idiopathi st ator hea Chro ic liv r dis ase G st ic ar inoma (ra) Faulty GI ab orption L uk mia ± P gnan y Infan y.

(3) F ro s Carbon t Pills N F P ll of I ı Car bon te B P 0 5 1 0 Gm (7½ 15 g) t i d p
(4) F ri ammon m c tr te solut n (50%) 4 c (1 d) t i d p
(5) F r Glu o t U S P 0 3 Gm (5 g) t i d p

b Pa teral iro I d atio intol r e to oral iron r fr to i too 1 on (p bso pt on) g str in t ti 1 dis e p e l d ng use of al i n pl c met of depl t d i n sto s whe o l ır fa l a d s ı tivity to o al n The foll wing forms of par ter l o ho ld b g en only ı am ta n e a y t or ct tl def c e y C l l t this mo t by the following fo mula 0 55 w ght (lbs) x (rm 1 Hgb %-pat nt Hgb %) mg of metalli on (tot 1 do e) n eded 25 mg for 1 Hgt

(1) Sa h t d on ox de f I V u C nt n 2% met llıc i on (0 mg per cc) G 50 mg (¾ g) St t a d the 100 150 mg (1½ ½ g) I V d ily u t l th t tal dos has b n g e
(2) Iro Dext an C mpl N N D (Imf o ®) fo I M s C t ns 5% n tall ir n (50 mg p c) G e 50 mg (¾ gr) Stat a d then 100 150 mg I M d ly or ve y oth day u t l the tot l do h s b e g n 1 je t d ply w th a 2 in h n dl i to th pp r out r quadra t of the b tto k u s the Z t ch ic (pull ng k to n s de b fo ins li g n dle) t pr v nt l ak g of the ol t n a d d olorat on of the kin

3 Adju ant ther py
a As b c Acd U S P G e a ng) c or orb c d t blet 30 50 mg p d y fo child en 100 150 mg per d y f ad lt
b D lut d Hydr hl Ac d N F (10%) 2 4 (½ 1 dr) t i d ın gl ss of w ter w th me l s pp d thro gh a gl s f be tube fr qu ntly has b e p s ıb d for pat nts w th chl hydra but r ce t v i n ndı t s th t d l t hvd chlo ac d do not f c l t t th ab o ption of ın th g tro ntestinal t a t If p c ıbed pat nt mu t b u h t th w th sod um b rbonat afte m ls t n nt al c d left on the t eth

B G l M s
1 D t H gh lo h gh p t in h gh on h gh vita nin d t At l ast 70 Gm p t ın/d y for av r g adult F od h gh ın on include l ver othe rgan m ts fr sh d m t yst s gg eg t bl e p ally veg t bl g p hes p ı ot p un t A 2240 lo d t contain ing 70 Gm pr t 115 Gm f t and 230 Gm bohyd te w ll t ın pp imat ly 20 mg of ı on
2 Vitam ns Vitamin defı i s re u lly mult ple and a a s ci ted with the nutr ti l d ficien ies Mak a ful u v y f n t tio l status b f dm ıst ıng exp iv vitamin p ep at n whı h re ot indicat d
a I d at ns V tam n d f e ie di tly o d e tly ss ıat d w th an m a lud b b pell g scu vy a d hypop th mbin m d t itami K d f e cy
b Def c y d eas a e most oft n multipl so t s s l ly dvi able t admini te m lti vitamin pr pa t o s Specific p p tio s Us o ly f r spe ıf tamin

deficiency (see page 59)

3 Whole blood transfusions preferably of fresh blood are used when there is need for rapid restoration of hemoglobin this n ed is more urgent when hemoglobin is less than 8 Gm per 100 cc (50%) (see page 247)
   a Acute hemorrh ge when blood loss is greater than 500 cc
   b Chronic hypochromic anemia when
      (1) Need for correction of anemia is urg nt (e g surgery and acute e p is)
      (2) Failure to respond to anti anemic measures Re evaluate and consider oth r causes fo the anemia (e g blood dyscrasias and serious constitutional diseases)

4 *Red cell mass (sludge) transfusions are us d to restore* hemoglobin and red ells without increasing pl sma vol m and perhaps reducing risk of serum reactio s

5 Thyroid May be indicated if an mia is associated with *frank hypothyroidism or myxed ma (see page 368)*

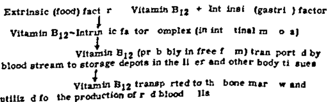
MACROCYTIC ANEMIAS

PERNICIOUS ANEMIA (code No 501 702)

Pernicious anemia (P A) is a chronic and if unt eated pro gressive macrocytic anemi The primary d f t is the failu of the gastric m osa to produce a substanc (intrinsic or g tric f tor) that is ssential for th abso ption of the vitamin B_{12} in certain foods

In the absenc of intrin c factor inad quate ab orption of vitamin B_{12} occurs and a defi ncy of thi vitami d v lops Vitamin B_{12} is ess tial for no mal e ythropoi sis Wh n d fi ient path logic red ll f rmation (m galoblast c r g nerat on) occurs The is no p imary defici cy f folic acid in P A Th disease re pond specifically to the par nteral administration of vitamin B_{12} or of extracts of *liver containing vitamin B_{12} or to th o al admin* istration of live or f prepa ti s containing i trinsi fa tor a d vitamin B_{12}

The relationship of dietary and gastric fa t rs to norm l b *formation (modifi tion of Castl theory)* m y be outlined as follow



Diagno is
A Symptoms
1 Anemia Weakn ss dyspn a and palpitation
2 Gastr int tin l Ano exia diar hea and dy pepsia
3 C N S Numbn ss and tingling of extremiti s and sphincter in ontinence
B S gns Pall r cteri tint tachycard a glossitis mild h patom g ly and pl nom galy dminution of vibr tory sens and ataxia
C Lab atory
1 H stamine achlo hyd ia
2 Ma ocyt c anemia
a M C V 95 160 μ
b M C H C > 32 36% (am s normal)
c M C H 33 38 γγ (or mor)
d Ortho hromatic meg lobl sts (normoblasts) pres t Anisocytosis poikilocytosis and poly hromatophilia
3 Bone marrow chang
a R d mar w i in r as d and soft
b La g numbers of m galoblast are pres nt
D The pe t c R pon e to Vitamin B_{12} Ext act of Liver and Li S b titut s
1 Disappea anc of symptoms and signs
2 R ticulocyte re pons (normal count is le s than 1%)
3 Improvement of an m Occurs bout 1 w ek after beginning ad quat par teral l e a d 48 72 hours afte ade q te vitamin B_{12} ther py

Tre tm nt
Tre tm t ho ld b based upon an a curate di gnosis Diff ent te f m num ous othe conditions cha act ized by macr cytic anemia
A Sp iff Me ur s Par nte l th rapy is st o gly r com mend d ltho gh oral pr par ti ns ar avail bl (s bel w) for thos p tient who cannot or will n t a ept pa nt ral t eatment N ithe crude li ext act nor foli a d sh uld be dminist r d to P A patients
Th p renteral administr ti n of r fin d ext act of liv r or of vitamin B_{12} i unifo mly follow d by optimal lini al and h matological re ponses Following uch th apy the P A pati nt in r lap e will und rgo an in e se in circulating r ticulocyt s (eaching a p ak in 6 10 days) and a r turn of erythrocyt and hemogl bin values to n m l in 3 5 we ks
1 Parent ral dosag and indic tions
a P un ompli at d P A in r lap e
(1) Initial I M inj ct on 20 30 mi r g ams of cry tal lin vitamin B_{12} (Cyano obalamin U S P) vitamin B_{12} o e t at r fin d (n nt t d) liv r ex t a t (Live Injection U S P) Liv inject on on t in 10 20 micrograms of vitamin B_{12} p r c giv th quival t of 20 30 mic ogram of vitamin B_{12} Vitamin B_{12} once trates may c u e allergic ea tions
(2) Subs qu nt inj t ons
( ) P ti nt in ver r lap e Giv 15 20 mi rograms vitamin B_{12} r quival nt v ry third fourth day

until blood values return to normal

(b) Mild relapse 15 20 micrograms weekly usually is adequate

b For P A complicat d by degeneration of the spinal cord Doses in excess of the amounts ne d d for uncomplicat d P A may be required The degree of rev rsa bil ty of neurolog c manifestations is inversely proportio al to th duration of symptoms Improvem nt frequently is mark d in patients with symptoms of 6 months duration or less less pronounced in patients with symptoms of 6 12 months du ation and negligible in patients with symptoms of more than 1 year s duration It is advisable to treat all patients intensively for at least 6 months and preferably for 1 2 years

Physical therapy including c ordination exercises is an important adjunct to the spec fi therapy of P A com plicated by spinal cord degeneratio

(1) In tial I M injection 30 60 micrograms of vitamin B_{12} or ref n d liver xtract

( ) Subsequent inje tions 20 30 micrograms 2 r 3 times w ekly for 6 months or m re or until opt mal n uro logic improv ment has b en demonstrated If optimal neurologic improvement has not occu r d at the end of 6 months continue w th 20 30 m crograms once a week

c Maintenance therapy The nutr t o al requ rement for vitamin B_1 in normal individ als is 1 0 micr gram or slightly less each day This amount administered to pa ents with P A in wh m blood values have be n re tored to normal nd opt mal neurolog c e ov ry has be n obs rved will p ovide satisfa tory ontr l in m t instances 15 mic ograms of vitamin B_{12} r refin d liv r extra t I M onc v y 2 weeks sho ld be d quate La g r dos s may be necessary during p riod of in re s d stress (infection prolonged d bilit ting or hr n c illness et)

Th patient must b instr t d a to the need for ad qu te and eg la spe ifi the apy for the rem inde of hi life The se ious risks of n glect should be mpha s sed

Oral preparations The espo e to the oral adm nistration of powde ed h gs st mach liv r stom ch preparations and tablets of vit min B_{12} (ev n in high do age) usually is slower less uniform and often s boptimal when ompar d with the re po s to p renteral therapy It s possibl that the ral dmin stration of intrinsic f to vitami B_{12} ompl x sub stances or the inhalat on of powd r d vit min B_{12} f llowing intranasal d s ing w ll p ove to be s t sfa t y methods of treatment but th reli bility of th se methods has not b en proved as y t

a Powdered Stomach *U S P (Ventriculi* [a]*)*

b Li er With Stomach *U S P (Ext* [illegible]*)*

Tablets of vitamin B_{12}

d Powdered vitamin B_{12}

e *Combinations* Vitamin B_{12} With Intri ic F cto C n *ce trate* U S P (d rived f om var ous sour es)

B Ge eral M asures P iodic clinical and blood examinations should provid the basis for administration and dos ge of liver iron and adjuvant drugs

1 Rest Patients with profound an mia should be at b d r st Hospital care may be necessary for patients with neural in v lvement (ataxia and sphincter disturbances)
2 Diet A di t adequate in calories minerals and vitamins does not need to be s pplemented with extra quantities of dietary liver un ess for some reason the pati nt is not re ce ving parenteral liver therapy
3 Iron Ferrous salts may be given as an adjuvant to liver the apy when the iron content o the r b c s is low (M C H C < 32% or low color index) Elderly patients usually require more iron (se page 219)
4 Dil ted Hydrochloric Acid N F (10%) 2 4 c (1/2 1 dr) t i d in a glass of water tak n thro gh a glass straw with meals may be given to patie ts who have diarrhea as a com plicat on of the achlorhydria Patients must brush te th with sod um bi arbonate imm di tely aft r meals to n utr lize hydrochloric acid and prevent rosion of t eth
5 Thyroid may be used in patients who fail to respond due to associated hyp thyroidism
6 Measures to improve liver fun tion in P A patien s with asso iated h pat damag have been suggested in an attempt to aid u il zati n and storage of the extrinsic factor (see page 280)

MACPOCYTIC ANEMIA OF PREGNANCY (code No 501 701)
(Pernicious Anemia of Pregnancy)

A hyperchromic macrocytic anemia haracterized by m galo blast sis in th bone marrow usually occurring at end of the second o during the thi d trimester of pregnancy

Treatment

This anemia responds specifically to the oral or parenteral ad ministration of folic a id or to crude liver extract (which contains folic acid) It does not respond to the parenteral administr tion of vitamin B_{12} or refin d liver extract (which ontains virtually no folic a id)

A Specific Mea ur s After deliv ry treatment with foli acid (or rude l er xtract) ma be dis ontinued sin e relapse does not o cur

1 Fol A id U S P 10 15 mg (1/6 1/4 gr) orally daily
2 Liver Injection C ude U S P 4 cc (1 dr) I M daily
3 Vitamin B_{12} and refined liver extra t are of no value

B G e l M s res

1 Give in r ased am unts of animal prot in even if diet is al ready ad quate begin rly and ontinue throughout preg nancy
2 If hypochromia occurs ferrous salts should be administ red (se page 219)

SPRUE
(Anemia of Sprue code No 501 703)

Sprue is a chronic disease of und termined aus (prob bly due to nutritional deficiency) characterized by sor mouth glossitis indigestion and recur ent diarrhea with steatorrhea it results in anemia asthenia emaciation and even de th Th anemi may be microcytic hypochromic normocytic hypochromic or m crocyt c hyperchromi (megaloblastic)

T eatment

A Sp ific Measures

1 For hypoch omic anemia Oral or intravenous adminstr tion of iron (s page 219)

2 For macrocytic hyper h omic anemia (w th megaloblastosis)

a Corticotrop n (ACTH) or one of the steroids (see p 424) are impo tant advances in the tr atm t of this form of anemia in non t opical sprue Imp ovem t in the anemia is thought to be the r sult of increased abso ption from the g trointestinal tract of nutr nts in food including hemopoietic f ctors (vitamin B_{12} folic a id etc)

b Alternat therapy If megaloblast n mia of spr e fails to e po d to st oids or co t otropin (ACTH) therapy give one of the following

(1) V tamin B_{12} U S P 15 30 micrograms I M 1 2 time per we k until remiss on s obtained and then 10 15 micrograms I M ev y 1 2 weeks

(2) Folic Ac d U S P 10 15 mg (1/6 1/4 gr) d ily o ally or p eferably I M

(3) Liver Inj t on Crud U S P 4 cc (1 dr) I M daily

B G al M s r s

1 High alo high p otein low f t high vitamin d et

2 Plasm and bl od t an f sions niti lly p r n for eve e hyp p ote n m a and an mia

3 Corti tr p (ACTH) or the st r ds may b used in the hypo h omi form in d s ge t l ed for correction of the m g loblast c anemia and sp ue (s p ge 423) Th se sub stan es in rease the absorpt n of nitr g n fat and other nut i nts from the ga troint st al tract

4 If hypop oth omb emia p t Menad o Sodium Bisul fit U S P 10 mg (1/6 g) I M or I V Stat followed by 5 mg (1/12 gr) orally b i d or v t m n K_1 tablets (Mephyton®) 5 15 mg (1/12 1/4 g) or mo o ally daily

5 Calcium Chlo d Phosphate o Glu n te U S P 2 Gm (30 gr) rally t i d and vit min D 5000 20 000 units if hypocalcemia or tetany exist

6 V tamin ppleme t by mouth

OTHER MACROCYTIC ANEMIAS

This group includes (1) nutritional macro ytic an mia (2) meg aloblastic an mia of infancy and (3) m g l blastic an mias s ondary to dise se of or operati e procedur s n th g trointe tinal tract

Tr tm t.
A Specifi M es Give foli acid crude liv r ext ct o vitamin B_{12} as for sp ue (see pag 226)
B G neral Me s re Provid an ad quat high p otein high v tamin d et

APLASTIC ANEMIA (code No 501 900 0)

An a ute or som times chronic di se of the hemopoietic syst m characte ized by an alte d production of r d blood cells r sulting from a d pr ssi n or exha stion of th bon marrow The condition may be secondary to known marrow poisoning but also occ s in th p imary or idiopathic form

Diagnos
A A hist y of exp ur to marrow toxins (g hemi als cer tai drug and ir adiation) i often obtain d Aplastic anemia a p rsistent progressive anemia which like certain other anem a fails to r spond to l ver iron or diet therapy Other causes of an mi annot b demonst ated Bleeding t den y is common
B L bo tory Finding
1 An mia i ually normochr mic no mo ytic
2 B ne marr w often (not invariably) shows apl ia with fatty and fib us epl cement
3 Leukop nia and thrombocytop nia a e u ually ma ked

T tm t
A Spe ific Mea r Non ar kn wn
B G n l M a u
1 Tran fu on Rep ted tran fus n with a efully typed and cr ss mat h d whole blood m y prolong lif for vari bl p r ods Rarely pat nts who qui nd ce a l g numbe of blo d tran f s o s m y go int spontaneou mission f r e al ye
2 Di o tin all unnec sary m d ation
3 R m ve pat nt f om exposu e to s pect d toxins
4 Diet Pr vid d t w th d qu t alo vitamins and miner ls
5 I n live and itamin th rapy sh uld be given an ad q ate t ial b t is f little valu in true aplastic anemia

HEMOLYTIC ANEMIAS

Cla f c tion (Mod f d aft D m hek)
A H r dit y D f t R d blood lls how an apparent m rpho l g al d f t wh h s an inh t us pt b lity r p disp s t on to h m lyt r t ons
1 Sph ocyti (fam li l) an mia (n ra i l t nd n i) (con g nit l hemolyti t rus ode No 513 092)
2 T g t ell (Med t ra an Cooley) an mi (familial e yth obl ti anemia od No 501 997)
3 Si kl ll an mia (Negr) (od N 513 9 4)
4 Other dis de with ab ormal h mogl bins

B Acquired Defect (Acquired H m lytic Icterus code No 513 911 9) Red blood cells are originally mo phologically n rmal. Etiology includes the following
1 Infections b cterial and proto oal
2 Toxins venoms dr gs and ch micals
3 Physical agents
4 Immune hemolysins
5 Agglutini s
6 Abno mal splenic mechan sms hypersplenism etc
7 Certain o arian cysts

C U known Defect (code No 513 900 9)

Di gnos s

A H tory
1 F amilial or racial hemolyt c tendenci s (hereditary)
2 Exposure to infections toxins aggl tinins (acquir d)
3 Symptoms of anemia (weakness dizziness p lp tat o and dyspnea) and hemolys s (fever chills abdominal pa n a d muscl cramps)
4 Th acut hemolvtic crisis s charact ri ed by sudden onset of fever a mia ict rus splen megaly with te d ne s and sho k

B *Phy i l Ex mi tion* Pallor icterus *tachy a dia* and fe er may be p esent in all types Splenomegaly and hepatomegaly oc ur in the acqu red and h reditary types

C Laboratory Find ng
1 Inc ased bl od destruction gives r se to
a *Norm cyti anem a*
b Bili ub nem a
c Hemoglobin mia (see table on pag 230)
d I c a ed f c l nd ina y urob linoge (ur n dark)
2 M rphologic r b c defe ts Sph ro ytes target c lls or sickl cells (see lass f ati n ab ve)
3 Altered r b c f agility (lways present in her ditary types)
4 In rea ed blood form tion is e iden ed by bone ma row hyp rplasia r ti ulo yto is and p esence of immature e ythr ytes tc
5 Le kop nia somet mes s pres t n the acquired fo m
6 Detect on and dentif cation of bnormal hemoglobin which give rise to h red tary t a t and anem a This req i es speciali ed hemical and el tropho et c t hni s

Treatment of A ute Hemolyti An m a (Hemolytic Cris s)

Patient mu t b t at d t o Ho pit lize f pos ble

A Severe Fo m
1 Treat sho k (s e pag 28) and a t an m ia C r ful observation of clinical p og ss s ss ti l
2 Whol blo d transf s n Blo d must be ref lly typed (m j r group a d Rh typ) nd ross mat hed both at room and body temperatu es Se re re ctio s may occur v n with a eful ro s m tching Stu gi recomm nds a ca tious prel mina y dmin stratio of 50 of s itable blood followed by an observ tion p ri d of 1 hou If no r a tion o curs the rema nd r of the blood may b gi en o er a 2 to 3 hou *period*
3 Plasma If p tient cannot toler te wh le blood t ansfu ions (because of *hemolysis* of injected red c lls) gi e plasma transfusions when ne es ary to comb t sh

4 Spe ific us s should be tr ted wh known
   a Infecti ns Employ spe ific ant inf ct ve and support ve measures (see pag s 496 to 514)
   b *Di continue drugs or r move f om co tact with poisons o othe h molysins*
5 Co ticot opin (ACTH) and the steroids m y produ e striking emissions of th hemolytic r tion and at l ast tempo ily tid the patient o er until such time that other mo e spe ific measures can be af ly institut d For dosag s of ACTH and co tiso e se page 424
6 Spl ne tomy After shock and f ve hav ubsid d and patient s ge er l phys cal st tus has imp oved suffic ently onsid r for early spl nect my If hemolytic shock is progre siv despite vigo ous supportive m asur s (up to 3 to 4 500 c t an fusi s) m rge cy pl n ctomy may be indi cated When the c us s unknown and r ct on has b en evere cons d r f r spl nect my after p t e t has re overed from th hemolytic isis Spl nectomy is not g nerally as s cc ssful in the acqui ed f rm a it is in the familial type and i g ner lly without be ef t in sickle c ll and famili l rythrobl stic anemias

B Mild F rm If the hemolytic react on i m ld only tr atm nt w th ant infect ve gent and corti ot opin o cortisone may be ne e ary In the familial type ven though the p t nt is ymptom ti spl nectomy m y b dvis ble

T atm nt f Ch oni Ph

A Instru t p t ent to avoid t muou exer is infect on xpo- ur to t mper tur ext me and ing st on or onta t w th drug o toxin
B Spl n ct my If pat ent f ils to imp ove on cons rvative th r py ons d fo pl ctomy (e above) When bnormal antibod s (iso and aut antibod) ar p s nt th ond tion is les often am nabl to plen ctomy
C Cobalt hlo de, 200 mg orally d ily, h b n empl y d in the h phases of ki c ll and Cool y anemia A id f m being g ne ally in ffe ti e th e s s me ha rd f alt ri g *thyroid fun t*

HEMOGLOBINURIAS

Diagn s (S t bl on th following p ge)

T atm nt

A Spe if M asur R move or tre t u ative f to
   1 P oxy mal old h mogl binuria Tr at st ge of syphilis p t (e pag 440)
   2 F v m Pr hib t ing t on of f v b ans
B Symptom ti a d Support v M su s
   1 H molyt ympt m
      a T e t a ut h molyti r t on (s p g 228)
      b T eat f ve hills and muscular ach and pain ymptomat ally
   2 Anemic ymptom T eat ac di g to type and s ve ity

DIAGNOSIS OF HEMOGLOBINURIAS

D sease	Precipitated By	Positive Laboratory Tests
Paroxysmal cold hemoglobinuria (code No 510 500)	Chilling or cold	Blood test for syphilis Don th Landsteiner test
Paroxysm l nocturnal hemoglobinuria (code No 510 500)	?	Acid h molysi test Hemosid rinuria test
Favism (code No 010 3761)	Ing t n of fava b ans	None
M rch hemoglobinuria (code No 510 500)	E e i e	None

Prophylaxis

A *P oxysmal Cold Hemoglobinuria* Prot ct against chilling or cold

B Mar h Hemoglobin r a Avoid strenuo s exercise

POLYCYTHEMIA VERA (ERYTHREMIA) (code No 501 79)

A chronic disease of the hemopoietic sy tem of unknown etiology characte i ed by overact vity (erythroblastic) of the bone marrow with resultant overproduction of red cells and hem globin It is manifest d by a reddish purple hue to the skin, increased blood vol me capillary engorgement hemorrhages venous thrombosis arterial hyp tension hepatom galy and spl omegaly and symp toms ref able to multiple organ syst ms It is to be diff rentiated from th poly ythemias that m y occu secondarily to known physiological st e s which also caus inc e s d bone marrow activity

Tre tm t

A D fi itive M s To duce the tot l r d blood ell volume

1 Ve s ction (phlebotomy)

a Ut l e careful blood hematocrit det mination in f llow ing efficacy of t tm t

b R move 500 of bl od daily until the blood hematocrit r aches a normal level Subsequ ntly 500 cc phle botomi s every 2 3 o mo months m y b sufficie t to ontrol mild cases

2 Irrad atio inhibition of red ell fo m tio

a Radioa tive phosph u (P^{32}) This i the m t effective anti polycythemic age t available at pr nt Its u is restricted to institution q ipped to handle radioactive material It is indi t d in patient in whi h the polycy themia cannot be contr ll d readily by ve e ectio alone and especially in patie ts with a hist ry of thrombotic r thrombophlebitic pi ode 4 6 milli uri f P^{32} (as ph sphate salt) in 2 6 cc of isotoni (1/2 1 1/2 dr) sodium phosphate solution a e given I V If the p lycythemi is not controlled following a single I V injection subse qu nt injections of 3 6 millic ies ar at inter als

of 2 months until the diseas is brought und r ontrol

b X ray irradiation Whole body or spray irr diation m y be of ben f t when given in r peated dosag s Ir diation of th lo g bones has proved to b l s satis f ct ry than whol body irr d tion in controlling the di ase

3 Anti poly ythemic drugs

Phenylhydrazine hyd ochlo ide or ac tylphenylhyd a ine *Follow patient carefully clinically and with blood studies during and after therapy* Th compounds ar mo t safely used if they a administ ed as maintenance the apy after the hematoc it has been r at ed to norm l by repeated venesections Give 0 1 0 3 Gm (1½ 5 gr) by mouth weekly as a mainte an e dose Th u e of ph nylhyd azine to lower an elevated rythro cyte ount om tting the us of venese tions to establish norm l r b c and h matocrit levels i a haz rdou p ocedure Anorexi nause and vomiting are the prin ipal disadvantag s of phenylhydrazin therapy

b Triethyle e m lamine (TEM) has been employed but xpe ien has b n limit d

B G n al M sur

1 Provid ymptomatic reli f as n ded

2 Di t Th diet should be d quate and nutritious There is no rat onale t tarvation di t or di t excluding no mal amounts f blood building foods

3 Info m pat nt rega ding the natur of his disease

C Tr tm nt of Complicati ns Varies with the status of the p lycythemia and the relat n of mplic tions to therapy as w ll as with th natu and s te of the compl ation Thrombosis and h mor hage a common omplic tions

ACUTE AGRANULOCYTOSIS (code No 502 7911)
(Agranulocytic Angina)

An acute and if unt e t d usu lly f t l illn of adults h a t riz d by xt em gran l cytopenia which is followed by a fulminating ep is ass iat d with ulcer t on of kin and m u membran s It is known t b used by c rtain drugs and ch mi cal but is sometimes of unknown igin

D g is

A Hi tory f Medicat n With C rtain Drug S lfonamid m pyrin a tan l d hoph inchophen Bism r en® thi ura l and rel ted ompou ds gold a d other h avy m tals it ogen musta ds Trid e® B ta olidi ® Th ra i e® b rbit at (? rare) asp in (? are)

B Phy i al E m t o S dd n o et f p is and fe er in flamm t n d ul ati n of m ous memb an of throat and le f eq tly of othe a s d of th ki d g nal ad ti

C Lab t y F di g

1 S l ukope ia and g an locytop ni

a WBC usually < 2500/cu mm
b Granulocytes < 50% of differential count (may be com pletely absent)
2 An mia absent (cf aplastic anemi leukemia etc)

Tre tme t

A Emergency Measures

1 Discontinue all unnecessary medication and *always dis continue offending drug promptly*

2 Control of infection during the per od of profound neutropenia

a Ant biotics May be used prophylact c lly to pre ent in fection or therap utically to control infection when it d velops The chief disadvantage of routine prophylactic use of broad spect um antibiotics (tetracyclines chlor amphenicol etc) is that if infection develops the ca s ative organism (especially the staphylococcus) may be resistant to a wide variety of antibioti preparatio s Therefore it s advisable under h sp tal conditions t withhold antibiotic therapy until infection develops then isol t the causat v organism pe f rm antibiotic se s ti ty tests and administer the antibiotic to which the organism is most sensitive During the period required to culture the organism and perfo m the sensitivity tests (48 hours or more after the first signs of infection ha e developed) a broad spectrum antibioti should be g ven Fo d tails concerning the selection and administration of antibiotics see page 514

b Sulfonamid s (aut on) may be empl yed if appropri te antibi tic p ep r t ons are not avail ble providing sul fonamides are not the off nding drug

3 Granulocyte formation P ntnucleotide folic acid vitamin B_{12} and pyridoxine are of do btful value in prod cing l ukopo esis

B G r l Me res

1 Ho pitali e and isolate f om avoidable infections
2 B d r t
3 Careful skin and oral hygi ne
   a Saline mouth wa h p n
   b L al treatment of k n and mucous m mbrane ulcera t ns (see page 86)
4 Nourishing liquid o ft diet as tol rated by painf l bu cal lesions Parenteral f eding may b n ssary (see page 25)
5 Foll w patient blood status by serial blood counts

Prophyl xis

A pat ent re eiving a drug cap ble of produ ing agranulocytosis must have regular and frequent WBC duri g th o rse of the apy The patient should also b ca tioned to discontinue th drug promptly in the e ent of sore thro t skin ra h chills or fev r and to e port to his doctor *at once*

LEUKEMIAS

Leukemia is an a ute or chron invariably f tal disease (o group of dis ase ?) of unkn wn etiology in lving the h mopoi tic t s ues and usually giving rise to abnormal leukocytosis and as o ci ted anem a Imm t re l ukocyt s ar usually p es nt in the pe phe al blood although the e m y be no alteration in the blood count or th e m y be mer ly an in eas in the number of normal l uk cyte

ACUTE LEUKEMIA (code No 50 7921)

D gnosis (S e table on page 234)

T tm t

Tr tm nt i only palli tiv although thi may change with the n w chemother pe ti ag ts *Radiation therapy is usually of more harm than benefit*

A C mbat anem a and bleed ng tendency by r peat d blood trans fusi ns as indic ted Impr vement i usu lly transient al though sh rt r missions hav been report d

B Ant m tabolit Ther py

1 F l acid antagonists (*Use with caution.*)

a Ag nts most ommonly u ed

(1) Aminopt in (4 aminopte oylgl tami acid)

(2) Methotrex t (fo merly call d am thopte in) (4 amino m thylpte oylglutamic id)

b Ind sti ns f r us A ute leukemia especially in chil d en Som degree of imp ov ment m y be expe ted in app o imately two thirds of the children treat d and mark d improv ment will occur in about 50% In d lts with acut leukemia th remi ion r t obt in d with folic cid antag ni ts i mu h low (12 to 15%)

c Do ge Foli acid ant gonists may be giv n or lly or I M the form r b ing p fe r d The size of the d se should b gauged by th age weight and physical ondi tion of the p tient Remember that the rang betwee the th ap ti and th t xi d se i v y slight Pati nts rec iving th se drugs m st b wat hed los ly and fr qu t blood count and bon mar ow examinations mad Tr tm t m st be di co tinued p omptly if toxi ymp tom app ar f if pan yt p nia and hypopl sia of th bone marrow dev l p

(1) Aminopte in Childr n 0 5 1 0 mg (1/120 1/60 gr) d ily ad lts 1 0 2 0 mg (1/60 1/30 gr) daily

(2) Methotre te Children 2 5 5 0 mg (1/24 1/12 gr) d ly d lts 5 10 mg (1/12 1/6 gr) daily

d T icity Th mo t important toxic manifestation a e stomatiti diar hea ul ative lesions at any site in or thro ghout the gast ointe tinal t ct g troint stinal h mo h g (sometimes m siv) and pancytopenia as o ci ted with v e hypoplasia o aplasia of the bon m r ow

e M thods of mb ting toxi ity (not alw y ff cti e)

(1) Prompt di continuation of f li a id ant goni t th rapy

DIFFERENTIAL DIAGNOSIS OF THE LEUKEMIAS AND RELATED DISORDERS

Di ease	Duration	Spleno megaly	Hepato megaly	Lymph nodes	WBC Total Count (usual rang)	WBC Differential	Bone Marrow
1 Chronic granulo cytic leukemia (code No 502 792)	38 mos (8 mos to 16 yrs)	+++	++	±	20 000 500 000	Immature myeloid cells	Myeloid infiltration
2 Ch onic lympho ytic leukemia (od No 503 792)	42 mos (8 m s to 8 yrs)	++	+	++	30 000 100 000	Imm ture lymphoid cells	Lymphocytic infiltration
3 Ch onic m o ytl leuk mia (code No 506 792)		±	±		25 000 100 000 (2 000 500 000)	Immature monocytic cells	Monocytic infiltration
4 Acute l uk mias (od No 50 7921)	8 wks (2 wks to 6 mos)	±	±	±	15 000 30 000 (2 000 100 000)	Blast cells (often un diff rentiated)	Leukemic infiltration Blast cells may be difficult to differentiate
5 Aleukemic my lo is (code No 502 7923)		+	±	±	4 000 (1 000 6 000)	Imm tu e cells (f w)	Leukemic infiltration (ot always)
Agnog nic myeloid metaplasia of plee (code No 520 958)	11 yrs	+	±	±	20 000 50 000	Imm ture myel id cells Nucleated r b c	Normal apl sti or hyperplastic m rrow

Not The an mia as ociated with the leukemias i u ually normocytic and m y vary f m mild to ev r
Th platelets are u ually incr s d in hroni granulo ytic leuk mia but may be d c a ed in all other
l uk mias the platel ts r us ally d as d

(2) Parent r l administration of Leucovorin C l ium N N D (sy thetic Leuco o toc citrovorum factor) in a ratio of 1 uc vorin to a tagonist of 1 1 10 1
(3) Blood t ansf sio Spaced at intervals to maintain RBC at 2 5 3 0 million/cu mm
(4) Ant bi tics if inf cti n dev lops (use appropriat anti biotic aft r causative o ganism has been isolat d and s nsitiv ty tests pe formed)

2 Purin a t go ists These ag nt only recently introduced are st ll in an inv stigativ st g of developm nt but in gen al th y appe r t be less toxi than th f li acid antagonists

Ag ts available for us
(1) Me ptopurin N N D (Purin thol® 6 M P)
(2) 6 Chlo opu ine
(3) O D a oacetyl l e ine (azas in)

b I dicatio s f r use Ac te le k m sp ially in adult An initial r mi sio rate of approximat ly 55% h been epo ted i adult and 50% in childre f ll wing t e t m t with 6 m r ptopuri e Th stat s f hlo opurine d zaseri remain u determ d at p s t

c D sag and pro ed re
(1) 6 Me captopu ine (6 M P) 2 5 4 0 mg /Kg body we ght/d y
(2) 6 Chlo pu ine 10 0 20 0 mg /Kg body w ight/day
(3) Az e i e 2.0 mg /Kg body weight/day

Thes ompound admin st ed orally in a ingle do e or in a d vided do twi e daily The ange b tw n th the ap utic and the toxic d e is wider than it is with th f li acid antagon st and h n pu in ant goni t appear t be om what saf to Me apt pu i e is the drug of hoi e for i t l the py t s dminist d d ly r g dless f th developm t of p ono n d d gr f leukopenia and n utrop n a pan ytop until bl t (st m) lls pr lymphocyt p gra ul ytes o pro mono yt s virtually dis ppe f om th b ne m w or until t ic sympt m d elop (s below) T e tment then is di ontin d and the pati t i watch d l ely If mplet lini l and h matol gi rem s ens no furthe t tment is giv n until relap occu s If no mission an in mpl t r mission i obtained th pa ti nt i placed on maint nance th py (usu lly les than 2 5 mg /Kg b dy weight/day) In a es in whi h e ist an t 6 m rcaptopurin appe to b de loping f v bl p om tim s an be obt ined by givi g a ase in in omb tion w th 6 M P or by adminis t ng 6 hl opu i

Th ful u f p e ant g nist d pend upo lose obs v tio of th pati t and n rial blood and bon ma w xamin t o s Th bo m r w rath than th p ipher l blood is employ d as th p in ipal the apeuti guid During th tag of drug indu ed bon marrow upp si p pe ly spac d blood t an fu ions m t be giv n as pp rti m asure

d Tox c ty T xic manif stations of mild d gr har d by ano xia and naus f qu tly e obs ved

RESPONSE OF CERTAIN DISORDERS OF THE HEMATOPOIETIC SYSTEM TO RADIOTHERAPEUTIC AND CHEMOTHERAPEUTIC AGENTS

	Dis e	R di the apy: R mm d d F ms nd S sitivity t I tli l T tm nt	R di the apy: N t e f R pons	Ch moth apy: R mm nd d D g and S t ty t Initi l T tm t	Ch moth apy: N t of R po se
Lymphomas	F llc l lymph m	X y (+)	A st	HN₂ (+++) TEM ( )	A t
	Lympho ytl lymph ma	X y (+++)	A t	TEM (++ +++) HN₂ (++ +++)	Ar t
	Lymph bl tl lymph s ll	X y (±)	P ll t	HN₂ (± o +) TEM (±) 6 M P (± +)	Pall ll n
	Hodgki lympho n	X ay (++ o ++++)	A t	HN₂ (t ++++) TEM (o +++)	Ar e t
	Hodgkin ca	X y (t)	I lli ti n	HN₂ ( ) TEM (± o)	P ll t on
	R tl lum ll e m	X y (±)	P llat n	HN₂ (± t ++) TEM (±)	P lli tion
	My s fung ld	X r y ( )	A t	HN₂ (++) TEM (± or +)	Ar (Pall tion
Leukemias: Chronic	Lymphocyti	X y (++ t ++++) p32 ( )	A r t	TEM (++ t +++) HN₂ (± to)	A r st
	G an locyt	X y (++ t ++++) p32 (++ t ++++)	A t	TEM (+ t ++++) Myl (++ to +++) 6 M P (++ t +++) U than ® (++) Fowl s ol tion (r ++)	A t
	Mon yt	X y (± t)	P ll tion	TEM (t) 6 M P (t ++)	A t
Leukemias: Acute	Lymphocyti	X yth py lly t ad i bl e pt f t atm t f localized infilt ti p32 m tim used		Ch ldr n Ant f l ((+++) h mon (to +++) 6 M P (to ++++) Ad lt 6 M P (to ++++) h m s (to ++) a ((li a (t ++)	A e t ?
	G an locyt			Ch ld and Ad lt 6 M P (t ++) h mon (t) antif li (t ++)	A t ?
	Monocyt			Ch ld and Adult 6 M P (t ++++)	
	My l m	X y (( )		H mo (t) t l li (t)	Ar t ? P lli ti
	P ly yth mi r	p32 (+++) r y (++ ++++)	P ll t on A st	U than ® (t ++) TEM ( ) A tyl ph yl hyd in ( )	P lli t A t

For f rt infl mg p ns to th py p g 237 The t m p lli ti n d t r Ar t ll ly p lli tion impli ymptom tic ll f t hort d ti n r t impls ts t f long d t

Altho gh clinical xpe i nce h sh n that rt i r the ditt re m re amenable t th rapy th are oth final udge ent sh uld re t up n pl nned tnt l f th rapy

More sev re t xic manifestations includ vomiting, stomatitis di rhea melena and rarely feve Tr at ment should b dis ontinued only if the mo e seve e to ic manife tations develop S ppr ssion of hem poie is (pancytop ia hypoplastic bon ma row) is not l ted as a to ic manif stat on since it is employ d as a th ap tic guid I reversibl suppre sio of hemopoi sis h s not b en bserved in patients t at d with 6 mer aptopurine To ic manif stations usually dis ppe w thin 3 to 4 d ys aft r t e tm nt i disco tin d

C St o d a d ACTH Th e comp und will induce lini al and hem tol gi impr vement in 50 65% of ch ld e with ac te leuk mi but th remission ate in adult cut le kemia is low (ab ut 12%) U fo tun tely p tie ts in whom tempo ary re mis ion has be n indu ed become efr to y t s bs qu t cour e of thes d gs (e page 423)

CHRONIC LEUKEMIAS (code No 50 792)

Diagn s (S e table o pag 234)

T eatm t

Tr tment i o ly palli t ve Think in te ms of c nt olling all phas s of th dis s fo as lo g as po bl but do not pla emph sis of t e tm nt n combating l uko yt is p r Som p ti ts qu e not e tm t o er p iod of years

A R d t on f Leuk mi Enla g m ts and I f lt at on Pr s sure ympt ms e lting f m nl g d glands and vis e a may prod c m chani al dis omf t p n or eri us involv ment f vit l tru tures I volvem nt of vit l st u tu s with l u k m c infilt ation m y o casi nally r qui su g l inter v ntion although th e p ti nts a e poo r ks

1. I adi ti n

X ay Th s f rm of t atment may be utili d s sys temi the apy (t t l b dy i ad ti) or s r g nal o l alth apy (t atm nt to p cifi g oups f lymph n des nl rg d sple n nodula leuk mi infilt atio s tc) It mu t b dmi te ed only by tr ined ad ologist

b R d t v ph sph rus (P^{32}) Th s f m of int n l ir d ation is mp abl fr it ff t to tot l b dy ir di ti nd has the advant ge of not c u ing di tion i kn s H w v t i vail ble nly in m d cal te equipp d t handl su h m t ial

2 Ch moth apy Th us f hem th peuti g nts havi g an anti l k mi ff t i an eff ti e method of t tm it H pit li ti n u ally i n t qui d Sinc th number of ag nt th t will ffe tiv ly ont l hr ni gran lo ytic leuk mia f r l ti ly l g p i d of tim is greater than thos vail bl f t eati g hr n c lympho ytic leuk mia and in th meth d of pr dure f r the e two dis as s diff th t tm nt will b d c ss d eparat ly fo a h

Ch oni lympho ytic leukemi In th eld rly p t e t ch ni lymph ytic leukemi is r lativ ly b nign and fr qu tly no t tm t is i d at d Th indu ation f

treatment are markedly enla ged lymph nodes especially if caus ng p ess e symptoms anemia due to bone m r row infiltration or extensive leukemic inf ltration f viscera skin etc

(1) Triethylene Melamine N N D (TEM) dispensed in 1 mg (1/60 gr) a d 5 mg (1/1 gr) o al tabl ts This rel tively n w drug appear to be the age t of cho ce because of its pronounced destructive eff ct on the mature lymphocyte *Use with caution* esp cially if the leuko yt count is below 50 000 c lls per cu mm If the leukocyte count is in excess of 50 000 cells per cu mm give 5 mg (1/12 gr) of TEM togeth r with 2 Gm (30 gr) of sodium bicarbonate orally 1 hour be fore breakfast (Sod um bi arbonate prev nts r action of TEM w th substances in the gastroint stinal tra t and permits absorpt on of th ntire dose) On the following day give 2 5 mg (1/25 gr) of TEM plus 1 Gm (15 gr) of od um bi a bonat 1 ho r b fo e breakfast Then wait 1 week and che k blood counts Repe t the admin stration of TEM t we kly intervals reducing the weekly dose to 5 mg (1/12 gr) wh n the l kocyte count fall below 50 000 cells per cu mm and to 2 to 3 mg s the l ukocyte count approaches normal When n rmal leuko yte val s have been attained discontin TEM the apy R m ssion m y last f om 6 to 24 months How v r during r mission blood examin t ons hould be mad at intervals of 1 or 2 montt

If the in tial leukocyte ount is above normal b t be low 50 000 lls p r cu mm give 5 mg (1/12 gr) of TEM or l s together w th sod um bica bonate on e ea h week until the de ired result is obtain d

(2) Nitrog n mustard (HN) R missi s obtain d with nitrog mu ta d in ch on lympho yt c l k mia usu lly are sho ter than those obt ined with TEM a d theref e TEM s preferr d to nit og n m st rd th r apy For deta ls of administrat on of nitrogen mustard s e page 241

b Chronic g anulo ytic leuk m a In nt a t to chronic lympho ytic leuk mia h onic granulocyt leuk mia l ways sho ld b treat d at the time the dis ase s f st dis ove ed Agent availabl for tr tme t a li ted in rd r f p fer n

(1) Triethylene Melamine, N N D (TFM) Quite f f ti e in co troll ng h onic g a lo yt le k m for l g per ods of tim It ha the ad ant ge of g v ing r missi n lasting from 3 to 10 months but d e to the larg dose employed it ha th d sadvantag of causing nausea and v m ting (ometim s seve) in some patie ts fo several h ur after administrati Howev r n u ea and vomiting may b minimiz d by administ ring 25 to 75 mg (3/8 1 1/4 gr) of hlor proma ine (Thorazine®) befo and at 3 hour int rv l aft r the administration of TEM It i important t r member that the dosage schedule for TEM in hron

granulocyt c leuk mia is significantly higher and there for quite different from that used in chronic lymphocytic leukemia.

If the leukocyte count is in e cess of 50 000 cells per cu mm give 10 mg (1/6 gr) of TEM and 2 4 Gm (30 60 gr) of odium b arbonate orally 1 hour before b eakfast. On the following day giv 5 mg (1/12 gr) of TEM and 2 Gm (30 gr) of sodium b carbonate 1 hour before b eakfast Repeat the above procedure at w k ly intervals after first performing blood counts Re duce w kly dose of TEM when the leukocyt count falls below 50 000 cells per cu mm. and dis ontinue ther apy when leukocyt valu s approach normal

If the initial leukocyt count is below 50 000 cells per cu. mm start with 10 mg (1/6 gr) of TEM w kly If r ponse to this dose is unsatisfactory give 12 5 15 mg (1/5 1/4 gr) e ch we k

(2) B ulfan N N D (Myl re ®), dispensed in 2 mg (1/30 gr) tablets for oral us Utiliz only in patie ts h ving chronic granulocytic leukemia w th high leukocyte count *Do not use in p tien s with normal or subnormal leukocyte cou ts* G e 4-8 mg (1/15 1/8 gr) da ly by mouth until maximum h matologi improvement achi v d, perf rming blood counts ev ry econd o thi d day Thrombocytopenia f erious degree may develop on daily oral doses of 10 mg (1/6 gr) or mor When th leukocyt count has returned to a normal lev l, p a the pati t on a maint nance dosag of 2 4 mg (1/30-1/15 gr) daily Myleran is ineffective in acut leukemia and in hron c lymphocytic leukemia

(3) Mercaptopurine N N D (Purinethol®). 50 mg (3/4 gr) tablets for oral us G ve 2 5 mg (1/20 1/12 gr)/ Kg /day in a single or equally divided dos by mouth until the l ukocyte count app oaches normal. Mainte nance the apy (2 5 mg /Kg /day or slightly les) th n is requi d to control the dis as 6 M.P is in ffec tive in hroni lymphocyt c leukemia

(4) Urethane® (ethyl carbamate), dispens d in 0 5 Gm. (7 1/2 gr) plain or enteric coated tablets for oral use This compound will control hroni granulocyt c leukemia for r latively long pe iods of tim but it has the di dvantage of causing naus a and anor xia in a high p oport on of patients and vomiting in ome Give 0 5 1 0 Gm (7 1/2 15 gr) t i d until leukocyt ount returns to normal, th n pla e on maintenance the apy giving the smallest amount ne ary to keep the l u kocyt ount at or near normal levels

(5) Fowler s solution (Potas um A enite Solution, N F) may be of alue when radiation therapy is con traindicated o navailable

Fowler s solution of administration begins with an initial dose of 0 3 c (5 gtt or 5 min.) t i. d orally for 2 days This dose is incr ased by 0 05 (1 gt or 1 min.) every other day until a d e of 0 6 (10

treatment are markedly enlarged lymph nodes especially if causing pressure symptoms anemia due to bone ma row infiltration or ext nsive leukemic infiltration of viscera skin etc

(1) *Triethylene Melamine N N D* (TEM) dispensed in 1 mg (1/60 gr) and 5 mg (1/12 g) oral tablets *This relatively new drug appears to be th eg at of choice because of its pronounced d structive effect on the mature lymphocyte Use with caution especially if the leukocyte count is below 50 000 cells per cu mm If the leukocyte count is in ex as of 50 000 cells per cu mm give 5 mg (1/12 gr) of* TEM togethe w th 2 Gm (30 gr) of sodium bicarbonate orally 1 hour be fore breakfast (Sodium bicarbonate prevents re ction of TEM with substan es in th gastrointestinal tract and permits absorption of the entire dose) On the following day give 2 5 mg (1/25 gr) of TEM plu 1 Gm (15 gr) of sodium bicarbonate 1 hour bef re breakfast Then wait 1 week and check blood counts Repe t the admin tr tion of TEM at weekly intervals reducing the weekly dose to 5 mg (1/12 gr) when the l ukocyte count falls below 50 000 cells per cu mm and to 2 to 3 mg as the leukocyt count approaches normal When normal leukocyt val es ha e be n attained discontinue TEM th rapy Remission may last from 6 to 24 m nths Howeve during remissi n blood examinations should b made at int rvals of 1 o 2 months

If the initial leukocyte count is bove normal b t be low 50 000 cells p r u mm give 5 mg (1/12 gr) of TEM or 1 ss tog th r with sod um bicarbonat o c each week until th d sired result is obtain d

(2) Nitrog n mustard (HN_2) Rem ssions obt ined with nitrogen m st rd in chron c lymphocytic le k m a sually are no t r th n those obtained with TEM and ther f re TEM is prefe red to nit ogen m sta d th py For d tails of administrat on of nit og n mustard see page 241

b *Chronic granulocyt leukemia* In c ntr st to hronic lymphocyti leukemi h oni gran lo yt l ukem a al ways sho ld be treated at the time th disease i fi st dis ove ed *Agents available for treatm nt ar listed in ord r of pref en e*

(1) *Triethylene Melamine N N D (TEM)* Quit f fecti in co t oll ng h on c g ulocytic l ukem for long period of tim It h s the dvant g of giv ing remis ons lasting from 3 to 10 months b t due to the large doses mploy d it h s the d s d antage of causing n useа and vomiti g (sometimes seve e) in ome pati ts for seve al hours aft dmin tration How ver n usea and vomiting m y b minimiz d by administering 25 to 75 mg (3/8 1 1/4 g) of chlo prom zin (Thorazin ®) belo e and at 2 hour interv ls after the administr tion of TEM It i imp rtant to remember that the do age schedule fo TEM in

gran locytic l ukemia is significantly higher and th re fo e quit diff rent from that us d in chronic lymphocytic leuk mia

If the l ukocyte count is in excess of 50 000 cells per cu mm give 10 mg (1/6 gr) of TEM and 2 4 Gm (30 60 gr) of sodium bicarbon t orally 1 hour befo br akfast On the following day giv 5 mg (1/12 gr) of TEM and 2 Gm (30 gr) of sodium bicarbon te 1 hour before b eakfast R peat the above p oc dur at w k ly intervals after first performing blood counts Re duc w kly dos of TEM when the l ukocyte count falls below 50 000 cells per cu mm and di continue the apy when leukocyt valu s pproa h normal

If th initial leukocyt count is b low 50 000 c lls per cu mm start with 10 mg (1/6 gr) f TEM w ekly If esponse to this dose is unsatisfactory give 12 5 15 mg (1/5 1/4 g) e ch week

(2) Bu ulf N N D (Myle an®) dispe s d in 2 mg (1/30 gr) tablets f r al e Utili e o ly in patients havi g chronic g anulo yt le kemia w th high leukocyte unts *Do not u e in patients with normal or subnormal leukocyte counts* Gi e 4-8 mg (1/15 1/8 gr) daily by mo th until m ximum hem to log improvem t is chiev d p rforming blood cou t e e y econd o thi d day Thrombocyt pen of er ous degr e m y d velop on d ily al d es of 10 mg (1/6 gr) o mo e When th l ko yte ount has r tur d to a n rmal l v l pl ce th pat t a m int n do ge of 2 4 mg (1/30 1/15 g) daily Myl an i in ff ctive in acute l k mia d in hro ic lymph cyt leukemia

(3) Mercaptopurine N N D (P rin th l®) 50 mg (3/4 g) t bl t for o al use Giv 3 5 mg (1/20 1/12 gr)/ Kg /d y in a single or qually d vid d doses by mouth until the l uk yt ount app oache n mal. Maint nance ther py (2 5 mg /Kg /day or slightly l s) th n l requir d to ont l th disease 6 M P i in ff ti in chroni lymph cyti l ukemia

(4) Urethan ® (thyl arbamat) di pensed in 0 5 Gm (7 1/2 gr) plain o mte i c t d tabl ts for al us This c mpound will ontrol hronic granul ytic le kemia for lati ly l g p riod f tim but it has th di advantag f causing naus a and anor xia in a high proportion of p tie t and v miting in som Gi 0 5 1 0 Gm (7 1/2 15 gr) t i d until l ukocyte ount ret ns t normal, th n pl on maint nan e the py giving th mall st amount ne s ry to ke p the leu k cyt count t n a normal levels

(5) Fowler s solution (Pota um A s nit Sol tio N F) may be of v lue wh n radi tion th apy is con t aindi t d or unavail bl

Fork e s technic of administ tion begins w th an initial d of 0 3 cc (5 gtt o 5 min) t i d orally f 2 day Thi dose i in r as d by 0 05 c (1 gt o 1 min) v ry oth r day until a dos of 0 6 c (10

gtt or 10 min) t i d is reached Further incr a e of d e 0 05 c (1 gt o 1 min) daily until toxic symptoms occur (anore 1 nausea and vomiting diar rhe) or the leukocyt count approa hes normal D s continue the drug for 2 5 days and then d cresse the maximum dose by 0 05 cc (1 gt or 1 min) daily until a maintenanc l vel f 0 3 0 5 cc (5 gtt r 5 min t 8 gtt or 8 min) t i d is rea h d This do is con tinued indefinitely keep ng the patient unde c ref l observation

(6) Nitrogen mustard (HN$_2$) May p odu full clinical remissions in c tain early and m derately advanc d cases of chronic granulocytic l ukemia these are s m lar to x ray response but are of short r duration Nitrogen mustard is not recomm nded for a ute leuk mia (ee page 241)

B Treatment of Certain Hematologic Abnormaliti s

1 Anemia Dete mine whethe o not the an mia is myel ophthisic or hemolytic

a Myelophth s T eat w th the app opriat anti l uk mic chemotherapeutic agent Adequ t nutr tion including supplementary v tamins is important but the adminis tration of n alts is of no value P riodic t ansfusions of whole blood may be ne es ry until the d sir d hemo ther peut c sult has been attain d

b Hemolyt Tr at w th st ro ds or c rt cotropin (ACTH) (see p g 228) If th h molyt c anemia of chron c le kemia nn t be ontr ll d by hormone therapy spl n tomy may be n s ry

2 Bleeding tendencies Pu puric and hemorrhagic ph nome a a e often due t th asso iated thrombocytopenia Trans f si ns of fresh whol blood are indicated Tolu dine blue rep ted to be of valu

-r less
del ce

3 Hem lyti crises S p g 228

C Oth Symptomatic M a u s

1 Treatm t of p ur t S e p ge 66

2 Treatm nt of ulce t ve t matitis See p g 261

LYMPHOMAS (code No 820) and LYMPHOSARCOMAS (code No 821)

A large ll defined gr p f di ease har t rized by pro gr ss e p olif ration of th hematopoi t t ssu s and manif st d by var ble inv lvement f lymph n d s splee bon mar ow l ve and other reti loendotheli l stru tu tog the with c n st tut onal symptoms of feve w ight l ss h mo h gic tendencies and an mia Th ex ct inte lationship f th d sea s are not known ther f re all cl ssif cati s rem i arbitrary and cont o versial Cln al typ s re oft n ind finite and m y merg into one another

Tre tment

Ce tain gen ral principles of manag me t may apply to th se diseases as a group

A Ge 1 M a Measures dir cted toward maint ining optimum gen al health should be carri d o t b t th y s ldom influ n e the our e f th diseases per se

B R di ti n and Drug Th effects f radiation and certain che nothe p t drugs may be p lliative o ar esti g but re s ld m if eve urativ The s sceptibility to a pe ific ther pe ti ag nt and the duration of ffecti en ss (for both palliation and a r st) will vary not only with ch d se but lso w th th st g of the dis se previous th rapy a d f om p t ent to patient Th table on p ge 238 o tl nes the respons of th variou h m topolet c d sorders to r diothe ape tic and ch m therapeutic agents

Although clinical experi nc has shown that ert in of thes ndit on, re mo e am nable to the apy than others final alu tion must r st upon a trial of the apy

HODGKIN S DISEASE (code No 550 954)

A p ogr s ve a d invariably f tal eticuloendothel l granu lom tous (lymph m tou ?) di e se of unknown etiology involvi g the lymph id tiss es of the body It i manifest d by p ogressive e la geme t of lymph nodes spleen and other lymphoid st u tur and o stit t nal symptoms of fev r weight los and anemia The l sions can in ol e any and all ti sues th efo e th manif tations a e protean Sev r l clini al and pathologi al types are r ognized anging f om a u lly mo e b nign fo m par g an loma w th a s rvival tim of 3 r more years to a rapidly fatal f rm sar coma w th a survival time of l ss than 1 y a Th d gn i rri ed t n linic l g ound m st be onfirmed by b psy to d ffer e tiate th condition fr m th h n infectious g a ul m s and f om the othe lymphom

Tre tment.

A Def tive Me ure (No know specifi therapy i avail bl)

1 I di ti n At pr s nt lo l or total body x ir di tion pr bably is th palli tiv me sur of ho e Clinic l im *pr vem nt is att but ble to regres ion in th iz of n* v lv d lymph t st uctur s and in no way p es t a ur f the dis a e Th v r ge vival tim s p obably un hang d but th p ti t i mad m re comf rt ble Un fo tunately l i n b c m pr gr s v ly ef ctory aft r subseq ent ou se of x y th apy N trogen mu t d th py h uld b t ed n radi r i tant pati nts

2 Comb d di tion and itr g mustard th py may o a lo lly a h v ben fits un tt inable by ith m thod d lo

3 Nit og n m tard (m thyl bis(β chl oethyl)amin hydr chlorid) (HN_2) HN_2 at p sent is th nitr g n mu t d m st c mm ly mpl yed Th indi at: a fo it us a e

a Wid ly dis minat d hronic g an l m tous Hodgkin s di e e th t has be m f t ry t x y the py

b Ch nic g anulom t u H dgkin dis s with vis al inv lv m t (sp lly lung pa e hym)

Hodgkin s om failing to re p d ti f to lly to

irradiation

HN_2 should be administered only in a hospital and only by a physician experienced in its use this is because of the *complications that may arise as a result of severe toxic reactions* *The response is similar* to roentgen irradiation but the remission is shorter (usually 1 to 3 months) HN_2 is given I V in a single dose The average dose is 0 4 mg (1/160 gr)/Kg body weight but slightly more or less than this amount may be desirable in certain ases (range 0 3 to 0 6 mg /Kg) HN_2 is stable in dry form but unstable in aqu ous solution Therefore *fresh solutions* must be used Add 10 cc (2 1/2 dr) of sterile isotonic sodium chloride solu tion to 10 mg (1/6 gr) of the dry salt in a sterile container Calculate amount the patient needs and draw this quantity into a sterile syringe of suitable size Inj ct slowly *taking no less than 10 minutes for the full amount* into the stream of an infusion of saline or glucose solution that is being de livered at a rapid rate *Do not inject directly into a vein* Great care should be taken to prevent the HN_2 solu tion from coming into contact with the skin or escaping from the vein into the surround ng tissues

4 Triethylene Melamine N N D (TEM) (See page 238) Mild cases of chroni granulomatous Hodgkin s disease some times can be controlled for months or longer by the oral ad mi istration of 5 0 7 5 mg (1/12 1/8 gr) of TEM [giv n with 2 Gm (30 gr) of sodium bicarbonate 1 hour befo e breakfast] once each month However TEM is more val abl in treating lymphosa oma than Hodgki s disease

An important use of TEM is intrapl ural administration in patients with serou o chylous pleu l effusions After withdrawing as much pleural fluid as p ssible 5 mg (1/12 gr) of sterile powdered TEM is dissolved in 5 cc (1 1/4 dr) of st il saline solution and inje t d into the pleural cavity Afte w thdrawal of th thorac ntesis n edle the patient is ask d to hange his position every 5 minut s f r 30 minutes so th t the TEM comes in o tact with e ten ive areas of visc ral and parietal pleu a This p ocedu e is even more eff ctive in tr ating o s or chylous pl u l eff sions in lympho a oma but a smaller dose (2 5 mg) of TEM should be given

5 Surgical excision Wide surgical e cision may be indicated for localized lesions e pecially if it is p imary (Initi l or p esenting area) This is a debatable m asure

B Ge ral M asu es

1 Maintain g od living hygiene with adequate diet exercise and rest
2 Ho pitalization is recomm nded during febrile ph se o with other complications of th illness
3 Transfusions of whole blood and other supp tive measu es should be instituted as the various m nif stati ns aris

MULTIPLE MYELOMA (code No 533 8221)

A chronic disease of unknown etiology sually occu ring after 40 years of ag marked by circ mscribed or diffuse bon m rr w

hyperplas a of plasma cell and chara teri d by neuralgic and skel tal pai s spontaneous fra tures x r y evidenc of skeletal d truct n B n e J nes proteinuria anemia renal insufficiency and an inva iably fatal termination

T e tme t

A Def tiv Me s

1 X ay therapy may provide sympt matic reli f but it i do btful if it significantly alt rs th cou se of th dis se
2 Ur thane® (thyl ca b m te) Ur than ® in dose of 1 5 6 0 Gm (22½ 90 gr) pe day as tolerated may provide symptomat relief b t probably doe not prolong life Car ful follow up with pe iodic leuk yte ounts is nec ssary
3 Stilb m dine I ethio te N N D Fo m rly used to r li ve sev e sk letal p in f lling to r po d to x ay therapy but s n e it us a s ver intr ctable t igemin l neural g a in a signif t p opo tio of c s it n w is us d in fr q ently in the treatm t of myel ma Wh n used it is g ven in fr shly pr pared solution containing 150 mg (2½ gr) stilbam din I M or I V daily or very oth r day for f om 8 to 50 injections The p ti t sh uld be plac d upon a d et l w in animal protein Car f l as essm nt of renal funct on prio to and during drug th apy is nece ary Al th gh p t ents m y how temporary lin al improvem t the cou e f the d se e emains p ogressi e and f tal

B Gen al M su es

1 P m te optimum g ner l h lth by d q ate di t st and le p
2 Caut n pat t g inst exp ur to undu physical t auma b ca e of su c ptibility to fract e
3 Whole bl od transfusions ne ded f mia
4 An lg s s f p in
5 E ourage flu ds t maint in g od u ine output

BLEEDING DISEASES

The m h isms invol d in th maintenanc of th co gul b lity and fluidity f the blood ar as y t incomplet ly und r tood Th ld l ssi al onc pt once ning th bl d gulation m ch anisms h e f il d to explain many phas s of ble ding phe m na Th th bl ding m hani ms are (1) clotting defe t (2) thrombo cyte (pl tel t) d f t and (3) c pill ry d f t th y r all clos ly int l ted and poo ly d m ted in many bl ding dis as s F om a lini l standp int it is p rhaps mor important to det r m the t ol gi b i for th ble ding It i important t r membe that the v ious individ al hemost tic test m y be lt d a wide variety of dis d rs and a s ld m pathognomonic

F r impli ity of p e t tio ar d for pu pos s of familiarity howe r the f llowing t bl of bleeding dis is based pon th ld l s ific t on On sho ld bear in mind that s ch diagno tic t g i s a tu lly difficult t e tablish in te ms of abs lut d fi i n i f sp ifi coagulation fact s

D gno i S table on p g 244

BLEEDING DISEASES SUMMARY OF DIAGNOSIS AND TREATMENT

	Di gn i C t	d M h ni m	Di g	T tm t
C pillary P rpur a	t pl y g lty (R mpel Le d j t t N rm l thr mbo yt ount l t t tf p thr mbi on t tion and oagul tion tim ong ing t m l	an l t Em gy V t min d i i d l t t t on t tility	oop g gh t t in mi b t b t l doc d t ood l gy d g d yn y H h S hö l in p rpu a l t h Dan d m mi oth d m an j H t y pill y gil ty p d h m phili	an pp w t miti i l d t b t Ant b t m l g ant t m rti id b id R T tm t g A o an t m top t m in
Thrombocyt Ab m l !	mbocyt d d p long d bl ding tim d l yed lot t tl N m l p thr mbin ont t tion and oag l ti tim g oagu t tim m l p o th mbin t tl	Idiop thi l g pl t y oph h k w m t m oc l m ph l f t d fi i Pl m h mb pl t m t d f A l t gl b d f m p hrombin i l d fl t yp p th mbin m b in g pe i in l A i gul	Idi p th th mbo ytop n p rp Q din Ch m d g Le k mi Thrombot th m yt pe p p Thr m p th p p H m ph l Pl m thr m p tin mp t d fi H m ph li id tat S m p t m l t d fi i y H m h g wb itami K d f i li d Ab p pl t m t	m C rti oid f h wh le blood aple t m l l t d R m t St p d wh loo T tm t f und l Co ti oid w F h b oo y ph p m F tion f ood F h blood lyophil d pl m it m n h Bl l li y T l d bl o p t m lf t i h p t t oid (? A M A A M
C a la ion /	long d oagul tion tim d d p thr mbi on t t on			

A d fi d l m O good E E al D ff l D g d 1 n f H h g D 94 958 (De)l 185

Tre tm nt.

A P te t From Str s s that Aggr vate Bleeding (Tocantins)

1 Lim t ct viti Advise occupations sports or other acti ties whi h in ol e minimal physical h zards
2 Pr te t a ea of body which a e s bject to injury
   a Lubric te nost ils and oth s perficial bleeding sites with p trolat m to prevent drying and c acking of scabs
   b Apply protective bandages splint o casts to existir g wounds to pre ent repeat d hemor hages
   c Bandage lower ext emiti s carefully to supply support to surfac skin v ss ls wh n indic ted
3 S rg c l pr edu es Limit the umber and ext nt f operative pro edures to a minimum
   a Consid n ed for ele ti su ge y refully
   b Minimiz t auma extent and durat n of operative proc du es
   c P f m op rativ p ocedur s in st g s (e g extract ne tooth o r mo e one ton l at a tim)
   d P pa e patient fo surg cal proced re by app opriate hemostatic techni (g p eoperati fr sh whole blood t an f ion o vitamin K)
4 C rrect intrins f ct rs
   a T e t ardiac f lu e r hyp rt nsion wh n pres nt
   b C r ct symptoms f violent co ghing sn zing tc

B *Lo al Bl ding Mu t Be Tr at d P omptly*

1 Band ging d p u e d e si gs f r hen ostasis
2 Topi l thr mb n may be pplied loc lly fo hemo tasi
3 Thrombopl tin Le s ff ctiv than th ombin
4 Adhes v Ab o b nt Ba d g U S P (G lfoam® O yc l® F bri fo m®)
5 El ct o o gul ti n
6 Chem al a te iz ti Us ally of alue o ly fo small bl eding s tes g pist xi (s e p g 111) Use tri hl r a t d fe ic hlo id t nni acid or h om b ad
7 Sn k venom (R s ll Vip) 1 10 000

C G s H m rh g o Ge al ed Bl ding Must b tr at d by m s wh h comb t sh k co t l ble d ng nd co re t a emi

1 Comb t hock (e p g 27) F h whol blood (ot olde than 3 4 h urs) s pref red b au e f its hemo tatic as well ts anti h k d ant an m eff ct Pla ma may b us d wh n whole blood not a il bl
2 Cont ol bl ding
   a Bl d d d i t es
      (1) Fr sh wh l blood transf i ns I V p (se p ge 27 u de Sho k) Th pl t let p es nt in refriger ted whole blood d t io at l rgely within 12 ho rs al tho gh th pl sm h m t t ffe ts may p i t f mu h l ng pe iod Blood t an f ion c ef lly admini t red ho ld be sid ed s an m g cy upporti m in all fo ms of hemo rhage ga dless of aus
      (2) Plasm t an fus on Transf sio of f e h f oz n pl m (not old than 10 days) pro id proth ombi

fibrinogen ant hemophilic globulin and certain oth r factors which may be of val e in controlling bleeding There are no platelets in plasma

(3) Antihemophilic Globulin U S P (Cohn Fraction I) in average doses of 200 mg (sometim s up to 600 mg may be required) in 5 10 cc physiol gical salin causes a d crease in the spontaneous clotting tim of the blood of hemc ph lic patients

b Vitamins

(1) Ascorbic Acid U S P See page 63

(2) Phytonad one U S P (v t K_1 emuls on M phyto ®) For u e in acute ꝁemo rhag em rgencie du to hypo prothrombi mia G ve 50 100 mg I V ve y slowly

(3) Vitamin P and related compounds Exp riment lly this gro p of ag nts has been reported to ncrease the capilla y resistanc in c rtain diseases in h man be i gs but linical stud es hav been discou aging Two preparation are Rutin N F 20 50 mg q i d and h speridine methyl chalco 50 mg q i d

c Corticotropin (ACTH) and the steroids (see page 423) m y produce t iking remissions of the purpuri o hemor rhagic reaction (incr ased red cell count and plat lets and decreas d bleeding tendency) and at least t de the pa tient over until s ch time as other more specific me s res (e g transfusions surgery) can be safely instituted

d Ant heparin ag nts In anaphylactoid shock se o dary thrombop n c p rpura irradiation rea tion n tr ge musta d therapy l ukem a meno hagi and in c rt in other cond tions heparin or a hepa in lik subst n is liberated n exce and app ars to be respon ble f a bl ding t ndency (hyperheparinemi) Th exces of h parin m y at tim s be count r cted by th u e of two ag nts protamine sulfate or tol idin blue which in ct ivat h par n by forming t bl chem l compl xes

(1) P tamine Sulf te Inje t on N F 50 mg in 5 cc qu o s solution I M eve y 4 6 ho rs until p te h ae e se to pp ar 150 mg n 250 500 c of 5% gl co e o no mal al giv slowly I V is often give at the tim of the fi st I M i je tion Pro tam ne t tratio s (see J A M A 139 1251 1949) may p ovide a i d x as t ff ca y of tre tm t

(2) Tolu din blue 6 8 mg /Kg body we ght di solv d in no mal lin given slowly I V (o r a 2 hou pe iod) daily fo 3 day and follow d by 2 4 mg /Kg for 3 addit onal days In prepar tion f th dye solut on t must be pas ed through a Seit filter f r st l ation and r moval of large dye p rticles Tran i nt nau a and v miting bluish tint t skin and blue oloration of urine and f ces m y be ncount red

e Spl n ct my Rem val of th sple n may be i dicat d in select d ca es of p mary thrombocytop ic purpur and in cases of s condary thrombocytopeni due to tain splenic disea es (hypersplenism) D mo tr tion of megakaryocytic activity by the bon m row i ess tial t the proper eval ation of the individual In gene l

spl nectomy i advised only in the 'hyperspleni forms of th ombocytopeni purpu a (primary or se ondary i e G uch Banti s and granulomatous diseases of the sple n) but the operati n m y be indicated in very selected ases of bone marrow m gakaryocyte deficie cy The decision as to need for splenect my should be m de by a trained hematologist

Rh FACTOR

(Reaction due to Blood Transfusion code No 010 38x)

When blood containing the Rh f ct r (from Rh posit v don r) is introduc d into person without th facto (Rh negative) the Rh facto acts as an antigen nd agglutinins m y develop against it (anti Rh gglutinins) Aft r the agglutinin have dev loped Rh positive blood f om don s is no longer suitable f r transfus on purp s s inc agglutin tion and hemolysis of the donor ells is likely to oc ur Th ev ity of such t ansfusion reaction (as with intergro p r ctions) may vary c nsid rably Rh se itization is lso kn wn to d velop by multiple p gnancies in Rh n gativ wom n w th Rh pos tive husbands

P ophylaxi

A Ge e al Rul s

1 All blood fo tran fusions should be Rh typed in addition to on entional intergroup typing and th n cross mat hed with r cipient blood
2 Rh positive individ als m y saf ly r iv blood only f om Rh positive don s
3 Rh eg ti individuals m y saf ly r ive blood only f om Rh n gativ do o s

B Sp cif R l *Never give Rh-p sitive blood to any of the f llowing*

1 Rh n gative individuals who hav had p viou transf sions
2 Rh n gative wom n who hav h d multiple p egnanci s by Rh positive husbands
3 Rh neg tiv p gnant wom n
4 Infants w th ythroblast is

T e tme t

See und r transfusion re tions on p ge 249

BLOOD TRANSFUSION

Phy i l gic l R tion l

Blood i giv n in ord r t

1 I as i ulating fluid v lum
2 In e oxyg n arrying c p city of blood
3 In in p otein con tr tion
4 In as oagulability of blood
5 Inc e immun bodie

Cont aindications

Transfusions must be given carefully in cases of acute pulmo nary edema cardiac failure nephritis and pulmonary embolism *or infarction*

Preparation for Blood Transfusions

A Typing and Cross matching

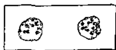
1 Determine blood type of rec pi nt Use known typing sera Anti A Bl od Grouping Serum U S P (or serum from Type B blood) and Anti B Blood Grouping S rum U S P (or *serum from Type A blood)* Blood type may be determin d acco ding to chart below

R c pient s r b c		R cipient s Type	
Anti B S rum	A ti A Serum	Landsteiner	M ss
+ Agglutination	+ Agglutination	AB	I
0 Agglutinat on	+ Agglutination	A	II
+ *Agglutination*	0 *Agglutination*	B	*III*
0 Agglutination	0 Agglutination	O	IV

2 Donor should always be of the same blood type as rec pient Cross match as indicated below In emergency situations Type O (Moss IV) blood (universal donor) may be adminis tered to any type Type AB individuals may re eive blood of any type (universal recipient)

3 Always perform direct compatibility test between don r and recipient blood befo e *each transfusion* even if the blood came from a previously compatibl donor Thi is d ne by mixing r cipient s cells (RC) and dono s serum (DS) on one side of a glas slide and donor s c lls (DC) and r cip ient s s rum (RS) on the other side

Donors cells
+
Recipients
serum



Recipients
cells
+
Donors
serum

Th slide s ro k d back and forth f r 5 minut s and ex amined with th low p w r m roscope If th re is any agglutination or sugg stion of h moly is a new dono must b found

4 Wh ne er possibl d termin the Rh of the r cipie t Rh neg ti re ipi nts hould r c ive only Rh n gative blood *Rh positive recipients may receiv Rh positive or Rh* neg tive blood in emerg ncie when no comp tible Rh positive blood is avail ble

B Disease Whi h May Be Transmitt d By Blood Transfu ion

1 Syphilis Don r should always ha e a ser l gi al t st f r syphilis

2 Malaria and hepatitis Blood f om a p rson with a histo y of malaria or infectio s or homologou um hepatitis should not be used

T hnic of Blood T ansf ion

There are two meth ds for administration of blood (1) indi ect transf ion using modifi d blood (blood to wh h anticoagulants have b en dd d and (2) di ect transf sion (blood t ansf red dir ctly by vein without addition of any substance) The first m thod is now used almost exclusively

A Indirect Tran f si n U ing Modified Blood Citr te is ed most f qu tly as th ant co gulant
   1 Collect on of blood A sp i lly p epar d vacuum fl sk th t o tains sodium c trate—cit ic a d in d xtros luti n is ommo ly us d to llect 500 c (1 pt) of blood Th ll tion appa tus i equipped w th a alve that llows the amount of uct to be regulated This s the tech ic us d i mo t bl od banks
   2 Admin t tion The ollect g bottle is connected with a Y tub to a small bottle of alin Th blood bottle is lamp d off at o a m of the Y The sali e is then us d to f ll the t bi g and start th infus o Aft the al n h s begu to flow i to the v in the bl od bottl is allowed t flow a d the sali topp d at o e f the arms of the Y tube

B D e t T an f ion This techn u s an apparatus n isting f a la ge syring and a smooth wo king 3 w y stopco k The blood is drawn int the syring from the d r th stopco k tur d and th blood inj ted immed at ly into ec pi nt

P ec utio in Admi ist tio

A Alway admin ster alkali (5 Gm or 75 gr sod um bi bon t) orally 250 c (1/2 pt) M/6 sod um la tate b fo b ginning t an fus on P ophyl i f r hemolytic r t n

B Ne er w rm blood befo admin t at o

C A e ag at is 40 t 50 d ops p r minut o 150 c (5 oz) per hour Can b giv n at m ximum rate of 1 (15 ♏) per e ond

D In es with my ca d al insuff ien y giv about 1 cc (15 ♏) p min t (12 15 d op p r minut) N v giv ov 75 (2 1/2 oz) in 1 hou xc pt in t tm t f h ck

COMPLICATIONS OF TRANSFUSION

T an f ion R tion

T ansf n hould b stopp d imm di tely if pat t ompl ins f hills g n ali d tingling ns tion ev anx ty p o d l opp sion p in in ba k of n k th ax and lumbar a a o a e f f llnes of the he d

A H molyti R tion M t s v e of all and m y b f t l Symptom m t on d bov u u lly app a during th tran f ion imm diately aft rward H molyti t ons almo t lw y s d by in mp tib lity f blood

B All gi Re ti Usu lly o u f ll wing t ansf ion
   1 M ld f rm Urtic i a gi oti d ma a d sino-ph li
   2 M v f m Diff lty of b thing a thm t c at t k T t l an phylaxis m y oc

C Ch m l R tion (Pyr g) M t mmon r ct ons R t on u lly u 15 minut to 1 h ur aft r t ansfusion Char t iz d by ch lls r ig foll w d by f

Tre tment of Transfusion R ctions

A Hemolytic R a tions

1 Rationale To attempt to prevent the precipitat on of acid hematin in the renal tubules Therefore alkalinization of urine and forcing of flu ds is important

2 Definitive measures

a Give 10 Gm (150 gr) sod um bicarbonate orally at once and every 4 hours If patient is unable to void 10 20 Gm (150 300 gr) sod um bicarbonate (specially pre pared see pag 15) in 100 cc of distilled water I V or 500 1000 cc (1 2 pt) of M/6 sodium lactate I V Re peat the dose in 8 hours or sooner if the urine becom s acid

b Collect all urines and examine for hemoglobin Continue alkalinization until no further hemoglobin is present

c Supply fluids orally or by parenteral means to maintain urine volume of at least 1500 cc ($1\frac{1}{2}$ qt) per 24 hours as long as renal function is normal (See acute renal failure page 303)

d In s vere or repe ted hemolytic reactions where re p ated transfusions may be necessary corticotropi (ACTH) or one of the steroids is ind cated (see page 423)

B Allergic R actions Treat as a y allergic re ction

1 Give 0 2 0 5 cc (3 8 ♏) of epin phrine (adrenaline) 1 1000 subcut at once

2 If symptoms p rsist may try antihistamini s (see page 45)

C Ch mic l React ons

1 During chill keep patient warm by adding blank ts and hot water bottles This is usually all that is required

2 How ver since the differential diagnosis from th allergic re ction is often impossible give epinephrine (ad enaline) 1 1000 0 2 0 5 cc (3 8 ♏) subcut as soon as p ss ble

Chapter 10

DISEASES OF THE GASTROINTESTINAL SYSTEM

NONSPECIFIC GASTROINTESTINAL SYMPTOMS

HALITOSIS (Bad Breath) (code No 619)

Hal tosi can re ult f om many caus s and treatm nt is di t d at emoval or orr tion of th se

Treatm t

A C ect bn malit es of o al hygien if p ent

B T e t E ist ng D s

1 Chron nas l and i us dise e

2 Dent l c f s gum i fe tions t nsilla inf tion et

3 Sy tem di eas s fev rs and to mias

4 Chronic pulmonary di e e g lung absc s

5 G tr inte tin l disea at any l l of th GI tr t

6 Neu psy hiat i di d rs wh r only th ubj tiv om plaint f 'bad br th p es nt

C El mi te Off nd g Fo ds From th D t

1 G rlic and n

2 Ri h or g asy foods if th y the known c u

HEARTBURN (Py o is) (od No 784 3)

Rul t pe if u Consid r speci lly di ease of l wer ophagu t m h bili y t a t

Tr tm t

A Drugs

1 Antacids Th se d ugs (pag 264) ar oft n eff ctive in l v g ou t m h although t i not felt that th r li f o bt in d i nec s r ly d p d nt upon th neutr lization of th g st hyd hlo c id

2 S dative Anti p modic m di at on (see p g 266)

B Bl d D t (S pag 54)

NAUSEA AND VOMITING
(Nausea code No 611) (Vomiting code No 614)

Th s symptoms may u ingly oncu e tly and m y b

due to a wide variety of psychic reflex or central causes

A Psychic Causes These are variable and may have either superficial or deep seated basis

B Refl x Causes Disturbances of various gastrointestinal structures and oth r viscera are capable of exciting the vomiting center Correction of this type of vomiting is therefore de pendent upon *removal* or alteration of these reflex disturbances

1 Irritat on inflammation or mechanical disturbances at any level of gastrointestinal tract (from pharynx to rectum)
2 Irritating impulses arising in any d seased viscera e g chol cystitis
3 Disturbances of semi circular canals e g seasickness
4 Toxic act on of cardiac drugs e g digitalis

C C ntral (Vom ting Center) Causes

1 Central metics Emetine apom rphine morphine
2 Exogenous and endogenous toxins
3 Increased intracranial pressure
4 Cerebral hypoxia C rebral anem a or hemorrhage

Tr atm nt

A Acute Simpl a ute vomiting such as occurs following dietary indiscret on or as experienc d in th morning si kness of early pregnancy may requir little or no treatment When neces sary treatm nt onsists of prescribing simple tolerated foods and occasionally m ld s dat v and antispasmod c drugs

B Prolonged S vere or prolong d nausea and vomiting r qu r s careful m di al manag m nt Specifi causes must be or rected or el minated The following general measures may b util d as adjuncts to specific med cal or surgical measures

1 Flu d and nutrition Maintain hydration and nutrition Withhold foods by mouth temporarily Administ r 5 10% glucos in sal ne or water I V in quant t s sufficient to ma ntain adequat hydration When oral feedings are re sumed commenc with dry foods in small quantit es e g salted cra kers Graham cr kers et W th morning si kness these foods may best be tak n before ar s ng Lat r chang to frequent small f dings of simple palat able foods Hot bev rag s t a and clear broths and cold beverages iced tea and arbonated liquids (specially ginger al) ar t l rated quite rly Avo d luk warm bev r ges Alw ys onsider pat nt s fo d preferen es
2 Drugs
   a Sedative antispasmodic drugs may b f alu (see pag 266)
   b Ethyl aminobenzoate (benz caine) 0 2 Gm (3 gr) with phenobarb tal 20 mg (1/3 gr) v ry s 8 hours p r n
   c Chlorpromazine Hydro hl rid U S P (Thor zine®) has been used for control of nausea and omiting due to a wid variety of au es It i dm ni te ed d ep l I M n dos s of 25 50 mg ever 4 t 6 hou s p n or orally in doses of 10 50 mg e ry 4 to 6 hour p r (see p 40)
   d Prochlorperazine N N D (Compazine®) 5 mg i i d q i d orally when feasible or 5 10 mg (1 2 cc) d ep ly into buttocks every 3 4 hours (not exce ding 40 mg /24 hours) has been reported to b valuabl

e Mecli ine Hydrochlo ide N N D (B namine®) 25 mg d ily may b of val in moderat cases

3 Psy hoth rapy
   a Is lat on of pat ent is recommended Hospitalizati n m y b necess ry Visiting should be stri ted
   b Avoid unpl sant psychi stimuli s ch as strange odors fo l smelling or foul t t ng med cation eme is b ins or oth r un ttra tive objects as well as f ods whi h are imp operly p ep ed or erv d
   c Pla e p tie t on a defin te tr tment prog am and let it be known that som thing i b i g done Hard boiled o brutal technics a e to be a oided
   d Attempt to dete min the p ychodynamics of the n us and vomiting but av id aggressiv psy hoth apy during acute ph e of th illn ss

HICCUP (Singultus) (code No 671)

Hic p although a common and u u lly benign symptom m y be a ma if st tion f ny o e of many dis es It is mp ta t to rul out a wid va iety of sp cif ca s s uro es C N S dis rd s pulmo o c rdia d so der g t ount st l d s rd r al fa lur inf ct ous d eas and oth d s as

Tre tm t

Tr tm nt of the ep c f c us may suffi e t lea hiccup Howe e t is u ually n s y to use rtain n p cif m u es to p ov de r lief fr m thi symptom Countl s m have bee ugg ted fo b ak g up the rhythmi r fl x All th t e tm nt m su may f l a d the symptom may b o p olong d nd s v as to j p d th pati nt lif

A S mpl H m R m d Thes meas r p b bly a t by di v ting th p t t att t on th y i t of dist ting on s ti f ight pai f l unpleasant t muli or f h ving p t e t p f m pp tly p rp el p ed res (holding b ath pping i e wat inh ling t ong fum tc)

B D g and M d c t on
   1 Sedation Any f th v us ommo d t v d ugs m y b eff t v Gi P t b bital S dium U S P Pe tobarb t n S d m B P 0 1 Gm (1½ gr) rally o 0 13 Gm (2 gr) by ect l ppo it y
   2 Anesth ti d ug Lo l an th tics e g c caine m y b ppl d t th al mu ous m mb an s o to th ph rynx G l th a m y b t d i i t a t bl s
   3 A ti p m d s At pi S lfat U S P B P 0 3 0 6 mg (1/ 00 1/100 g) m y b giv n s b ut o sly
   4 Amyl n t it inh l tio may b eff ct
   5 Ca bo di d H p tie t eb ath to a pl in p p b g f 3 t 5 min t s administ r 10 15% CO mixt e by f mask fo 3 t 5 min t
   6 Chlo p om ir Hyd o hlorid U S P (Thor zi e®) ha b fully u ed fo prolo ged o i t ct bl hi cup (p ge 252)

S g al M s V rious ph e ic n r op atio s in l d g b l t l ph cotomy m y be i d ated in c tain e tr n

cases which fail to respond to all other measures and which are considered to be a threat to life

CONSTIPATION (code No 630)

Eliminate specific causes of constipation first Rule out coloni or rectal lesions hypometabolism or ps chogeni causes Be *especially suspicious* of specific causes when th r a e sudden un explained changes in bowel habits Inadequate fluids and low residu diets may have a constipating effect The following commonly used drugs which the patient may be receiving for an unrelated illness may cause constipation belladonna and derivativ s narcotic drugs bismuth salts calcium salts aluminum hydroxide gels (Amphoj l®) aluminum phosphate gels (Phosphalgel®) and iron salts

Tr atment

A Cor e t Patient Attitud Toward Elimination

1 A daily bowel movement is not essential to normal health or well being Tr ere is normally consid rable individual vari ation in the frequency of bowel movements

2 So called auto intoxication th ories are unfound d

3 *Constipation particularly for short periods is seldom c use* for alarm

4 Many symptoms (e g lack of pep) attributed to constipa tion have no such r lationship

5 Periodic purgation se ves no tonic purpose

B Re stablishment of Regular Ev cuation

1 The gastro olic reflex sl ould be utilized to optimal ad vantage by having p tient set aside a r gular daily period after a meal (pr ferably br akfast) for a bowel mov m t even when the urge to def cate is not present This is based physiologically on the primitive eflex wherein d stention of the stomach by food sets off a reflex evacuation of the colon Explanation of the reflex vacu t on as it occu s in infants after feedings appeals to many pati nt Emphasize the fact that th s normal reflex is p rv rted or l st by personal habits or social ustoms

2 Suffici nt time must be allotted to p rmit a leisurely per formanc of the act

a Pat nt may alt r h s daily s hedule to permit more time for bowel mo em nts

b Relaxation may be aided by e ding a book etc while itting on the toilet

3 Catharti s and enemata should *never* b employed without direct advice or upervision of a physician if pati nt ever ex pects seriously to c rrect his on tipation sinc these m a sur s interfere with the normal bowel reflexe Fo psycho logical r asons if not physiol gical it is sometimes inad visable to dis ontinue uch m asu es suddenly if patient has employed them for a prolong d p riod f time It may be *better to compromise* temporarily with interm di t m a sures of bland laxatives and mild enemata (ee next p g) Chronic cathartic and en mata addicts often d fy all medi al measures and th ir treatm nt is pecially hopele when

there are serious underlying psychiatric disturbances

C Di t In general the diet may be profitably modified to satisfy the foll wing r quirem ts (see pag 54)

1 Adequat volume Often constipation is merely due to inadequate food intake
2 Adequat bulk o residu This does not necessarily imply ro ghage such as bran Smooth or bland foods may be p eferr d in spastic onstipation
3 Veg table i ritants Unless there is specific contraindi ation (g— intolerance) st wed or raw fruits o veg tables may b of value in many cas s of chronic constipation especially th s c ll d atonic type
4 Adequat fluids The p ti nt should be encouraged to drink ad quat or larg quantities of fluids o th t in reas d water is avail ble in the intestin l tract for passage of inte tinal contents
   a Six to 8 gl ss s of fluid p r day in addition to fluid con tent of food a e o dina ily s ffici nt
   b The time hon red glass of hot wate taken a half hour b fore br akfast se ms to ex rt a mild laxative effect

D E ercis Moderate physical exe cise adjust d to individual eeds and capabilities is ssential Bed patient may profit by ctiv and passi e ex rcises Good ton of the external abdom inal muscles is imp rtant Corrective physi al th apy may be employed in p t nts with ptotic abdom ns

E M di ations

1 Bland laxativ s *These agents should be employed temporarily during the bowel training (re-educati on) program or as a compromise measure in long stand- ing cathartic and enemata addicts They are never intended as a substitute for a careful bowel train- ing program They should be withdrawn as soon as the c nstipation improves*
   a Liq id P trol tum U S P L quid Paraffin B P (min r l oil) 15 30 cc (½ 1) T 2 tim daily p r n
   b Agar U S P B P w th min ral oil 15 30 c (½ 1 oz) 1 2 tim da ly p n
      Do not use mineral oil over prolonged periods in e it inte f re with absorption of foodstuffs parti u la ly f t s luble vitamin Ther i als som isk f lip id pneumonia ev n f om its oral u e
      Oliv Oil, U S P B P 15 30 cc (½ 1 oz) 1 2 times daily p n
   d V g tabl mu lag g P yllium Hydrophil M illoid N N D (Metamucil®) 1 3 tsp b d to t q p mi d in full glas f w t
      Cas a a S g d A om ti Fl id Ext t U S P 4 8 c (1 2 d) h s ve y ight
   f Mag ia Magma U S P (milk of magn s) 15 30 (½ 1) h v y night
   g Sodium Pho phat U S P B P (disod m pho phat) 4 8 Gm (1 2 d) in hot w t r b f b akf t
   h D o tyl Sodium S lf inat U S P (C la ® D n t ®) a u fa w tting ag t in e omm d d dos ying f m 50 t 480 mg p d y

2 Sed ti s S pag 39

F Enemas *Enemas interfere with restoration of normal bowel reflex These measures (as with above medi cations) should be utilized only as temporary means in chronic constipation or fecal impaction They may be necessary for cleansing a bowel preparatory to diagnostic studies or proctoclysis*

1 *Saline enema (non irritating)* Warm physiological saline solution 500 2000 c (1 pint to 2 quarts) p r n
2 Warm tap water (irritating) *500 1000 cc (1 pint to 1 quart)* p r n
3 Soapsuds (S S) enema (irritating) 150 cc (5 oz) of soap soluti n n 1860 cc (62 oz) water
4 Oil retent on enema 180 c (6 oz) of m neral oil or vege table oil instilled in rectum in the evening and retained over n ght A cleansing soapsuds enema is gi en the following morning

FECAL IMPACTION (code No 660 616)

This condition should be suspected in all severely const pated patients *especially bed patients Appropriate anticonstipatio measures (see p 254) will usually* p eve t imp ct n

Treatm nt.

A Manual removal of fecal mpaction
B O l retention en ma followed by clean ing enemas p r n (see above) Manual remov l of imp ct on may be facil tated by this pro dur

FLATULENCE

El minate sp cific sua of fl tul nc Gastro test nal gas is in large part due to *swallowed* air (ophagia) However flatu lence may be d e to dietary cau es and f n t on l and organi dis ase of the digest ve ystem

Tr tm t.

A Correction of A ophagia Anxiety stat a often associ ted w th deep breathing and ighing and the co equent swallowing of considerabl qu ntities of a r When possible treat und r lying anxi ty featur s A conv n ent and simpl method for re lieving the distention fl tulen and bel hing during acute anx ety states with sev r aerophagi i to ha the p tient place a small cork b tween his t th a thi h th effe t of pre enting a r swallowing
B Corre tion of Physical Def t Th s somet m i terfer with normal swallowing and/or breathi g
   1 Structural d formities of the nos a d nasopha ynx e g nasal obstruction and adenoids
   2 Structural deformities of th te th Sp tl l defect
C Good Hygiene and Eating Habit Instruct the patient to

1 Av id ating too rapidly and too much
2 Av id eating whil und r emotional str in
3 A oid taking lax tives
4 A id hewing gum
5 Av id d eta y indi cretions

D D t
1 Th di t sh uld be composed of bland high prot in low fat low ca bohyd ate f ods (se p g 54)
2 *Restrict gas-producing or irritating foods* -
a Avo d most raw fruits and v g tables especially abbag ucumbe s onion peppers elery tomatoes and beans
b A oid sugar in large quantiti s o concent ated forms A oid fri d food
d Avoid nuts raisins be r and other se dy fruits
e Avoid pices
f Avoid l ohol a d a bonat d bev rag s

E M d c tion These agents a in g ne al uns tisfa tory and at tim a only of pl ebo value
1 Ant spasmod c edat dr gs (see p ge 266) are perhap the m t u eful of th med tions Besid their ant pasmodic ed tiv ffe t th y erv t dimini h th flow of s liva (wh h is often exc ss e in th e pat nts) the eby redu ing th a ophagia wh ch a omp n the swallowi g of the x c iv quant ty of saliva
2 Spi t of Pepp rmint U S P B P 0 5 (7½ min) t i d in a mall gl s of w t p c
3 N ostigmine B om d U S P B P (P ostigmin B omid ®) 15 mg (¼ gr) t i d p
4 Dehyd ocholi Ac d U S P (De holin®) 0 25 0 50 Gm (3/8 3/4 g) t i d p c
5 Ox Bil Ext t N F (bile salt) 0 3 Gm (5 gr) t i d p
6 Ad o b nt g Kaol n N F B P and char al em w thout r al phys ol gi al justif tion wh n one co d the quantiti of ga e to b d bed as ompar d with th quantity of th drug to b g n

DIARRHEA (code No 635)

Et ol gy
Att mpt t d t mi the etiolog o an tom l o g wh p sibl Th u of dia h a may b cl s f d as f llows
1 P ychog i d so d N vo dia hea
2 Ga t i d s e Achlo hyd ia
3 Intestin l
a Inf t s d a Vi l ter t am biasi
b E og o to Hea y metal po o ing
c Dr g Catha s habitu t o
d Str t ral Gastro lic f st la
e N oplasti di e C nom
f Idiopathic Ch onic ul at ve colit s
4 N t iti l d ff i s Sp u
5 P r t dis as P cr tic insuffi n y
6 B l ary t t diso d s Ch l d ch duode ost my

7 Reflex from other viscera Pelvic pathology (extrı s c to GI tract)
8 Neurologic disease Tabes dorsalıs
9 Metabolic disease Hyperthyroıdism

Treatme t

A Eliminate the sp cifi cause, whenever possible
B *Co r ct Physiologic l Change Indu ed by Diarrhea* In addition to necessity for control of inte tinal hyp rperistals s it is essential that the following secondary or compli ting featur s be treated
1 Fluid imbalance (dehydration) (see page 7)
2 Mıne al imbalance e g hypocalcemia (see page 380)
3 Nutritional disturbances e g hypop ot inemia (s e p ge 58) and deficiencies (see pag s 60 64)
4 Psychogenic d sturbances e g fixation on GI tract or anxiety regarding sphincter mishaps ın s s of long standing diarrhea

C D et
1 Non irritant foods Many clinicians feel that food should be withh ld or that the intake during th fi st 24 hours should be restricted to liquid foods (See bacillary dysent ry page 276) During the *acute* phas of ent ritis the only foods which should be taken by mouth are the following ry bland items water w ak t a rice or barley gruel meat b oth precooked ce eals t ast d b ad or soda cracke s with b t ter and soft cooked (not fried) eggs Th e food ar usually administer d in about that same o der as t lerst d
2 Bland foods (never highly spiced or seasoned) These foods should be in orpor ted in the d ets of patients convalescing from acute dia rhea or w th *chronic* diarrhea Th y in clude ın addition to th no i ritant f od the following item reals with m lk o am t ain d broths and soup bland cheeses f h f wl and meat (n t f ed) potatoes (not f ied) breads milk products ggs and food beverages (not arbonated)
3 *Avoid Vegetables and fruits (especially raw) fried foods bran whole grain cereals jams jellies preserves syrups and candies pickles relishes and spices coffee carbonated and alco holic beverages*
4 Supplem ntary vitamins The bland d et s a r stricted d et and may f rth r i icreas the vit min d fi i ncy ind ced by altered int stin l absorption P tients with chron di rrh a should pr bably receiv vitamin in do ag s comparable to those u d f r chronic vit min d fi i n y t tes Ro ghly th s amount may vary f m 4 to 10 times the orm l main tenan e d se (see pag 58)

D Anti diarrh al Ag nts
1 B smuth pr pa at ons Thes may b u d for ith acute or chronic diarrheas
a B smuth Subcarbonate U S P B P 1 2 Gm (15 30 gr) aft r liquid bowel mov ment or q i d
b Bismuth M gma N F (bismuth hydr id and s b rbo nate) 4 cc (1 t p) after liquid bow l m vem ts or q i d

c ℞ Bismuth subcarbonate 15 30 0 ʒss i
Camphorated tincture of
opium (paregoric) q s ad 120 0 ʒiv
Shake well
Sig 4 cc (1 tsp) after liquid bowel movements or q i d

d Milk of bismuth and par g ic (equal amounts of each) may b ubstituted for the above mixture using th same do e

e ℞ B lladonna xtract 0 5 gr viiss
Bi muth sub arbonate
Calcium lactate
Kaolin āā 30 0 ʒi
Peppermint oil 2 drops gtt ii
Sig 4 cc (1 tsp) t i d a c and h s or after liquid bow l mov ments p r n (modified aft Bockus)

2 P ctin kaolin compounds Th se are availabl and are use ful mixtures Do e 15 30 cc (1/2 1 oz) t i d a c and h s or after liquid bowel movem ts p r n

3 Albumin tannat This drug has been recomm ded as an adjunct to other m sures when dis harges are profus Dose 2 Gm (30 gr) t i d a and h s o after liquid bowel mov ment p r n

4 Opi tes Opiates must be av ided in chronic diarrheas and ar pr fer bly v ided in acute dia hea unles th r i in tractable diar hea vomiting and colic Alway x lud th p sibility of acute surgi al abdominal di s e befor ad mini tering opi te

a Campho ated Opium Tincture U S P B P (paregoric) (NOT Opium Tinctu e U S P) 4 8 (1 2 dr) after liq id movem ts p r n o with bismuth (ee above)

b Cod ine Ph ph t U S P 15 65 mg (1/4 1 gr) a b ut after l quid b wel mo ements p r n

5 St ong opi tes Morphin and dihydrom rphi n h uld b r s v d fo s l cted p t nts with ut s e di r h a who fail t po d to m re o s rv ti m ures

a M rphin S lfate U S P 8 15 mg (1/8 1/4 gr) sub t aft r liq id bowel movem nts p n Thi drug may b od nau ea and v miting

b Dihyd omorphin Hyd hl id U S P (Dil udid®) M y b ub tit ted for m rphin if th und i abl d ffect of morphin a e to be avoid d D 2 3 mg (1/32 1/20 g) I M aft l quid bow l mov m nt p r n

6 Antispasm di and s dativ d ug (e pag 266) The anti pa modic dr g parti ularly wh n u d in combin tion with th barb t at s xert a favorable and mild antipe ist lti t on It m y be n ary at tim to administer the v iou b lladonn b lladonn lik lkaloids t a p int of t i ity in o d r t a hiev th d ir d ff ct Antisp modi s d ti d g may be consid red the ag nts of ch e in th t tm t of hroni diarrh a ociat d with anxiety t n ion t t s

7 Dig stant dr g Hydro hloric id panc e tin, and bil salt at tim s gi d finite non p if relief Wh n there i demon t abl d fi i ncy of th e ubstanc s repla em t th apy is mo triking (S sp ifi diseas s)

Treatment.

There is no satisfactory treatment for carcinoma of the esoph agus

A Di t Soft or liquid food should be given as tolerat d gast os tomy feedings may be given in sele ted cases
B Surgical Removal This is reserved for the few who have no demonstrable m tastases and ar good surgical r sks
C Deep Radiation Therapy This may be employed in sel cted cases when surgery is not feasible
D Morphine sulfate or other suitable analgesic agents should be administered as nec ssary for reli f of chronic pain, especially in terminal cases (see page 33)

CARDIOSPASM (code No 641)

Spasm of the lower end of the esophagus may be due to local or reflex causes Dysphagia, pigastric pain, and regurgitation of un digested foods are the most common find ngs X rays reveal dila tation abov the site of obstruction

Treatment

A Soft or liquid food as tolerat d
B Autonom c drugs hav been employed with variable and non spectacular r sults Large doses of parenteral antispasmod cs are often ineffective R cent exp rim ntal and clinical studi s suggest that the sympatholyt c agents may b ffecti e (see pag 266)
C M chan cal d latation of the cardia by graduated bougies may be nec ssary

DISEASES OF THE STOMACH AND DUODENUM

PEPTIC ULCER
(Gastric code No 640 951) (Duodenal code No 651 951)

An cute or chron c ul erat on of any portion of the GI tract wh ch may be xposed to the s t o of a id ju e Les ons may occur at any point in the low r sophagus toma h upper duod num (mo t common) gastroenter stomy margins and in certain anomalous areas f the GI tract (e g Me k l s div rticulum) The ulceration may be simpl or mpl at d by hem rrh g perfora tion scarring and obstr ction o by mal gnancy

Diagno is

May be bas d upon

A Hist ry
1 Pain Class cally th re is po tprandial (1 2 hou) or fast ing pigastri discomfort burning o pain usually relieved by bland food and/or alkali s
2 Oth r symptoms N usea omiting flatulence distention hematemesis and mele a
B Physical Findings Often local tendern ss in the epigastrium

C Lab ratory Finding Th re may be
  1 Abundant or x essive fr e HCl in gast ic juice both with and without histamine inje tion
  2 Gross or occult blood in stools
D X r y Evidence of Ul e ation Based upon films and fluoros opy of GI s ri s Ulcer ctivity s usu lly indicat d by presence of niche or irr gula ity of mucosal contour but sometimes evi de ce is indir ct such as alte d peristalsis pylorospa m gastric et ntion or persistent d formity R p at d GI series m y be nece sary to d monstrate active ulceration in ce tain cas s
E Ga tr s opic d mon tr tion of ulc r rater

Diagn stic Crite ia
A It s not ad ble to make a diagnosis of peptic ulcer unless th re is or has bee x ray o g stroscopic vidence of ulcer
B In face of cl ar cut peptic ulcer history without lab ratory con firmation it may be necessary at times to perform rep ated GI series
C M lignant disease ho ld be suspected wh n th f llowing find ing s e pr sent
  1 Location The l sion is locat d in the stomach particul rly if in th prepyl ric region high on the l s er cur ature or if on the greater curvatur
  2 D r tion of symptom is short (no p vi us sympt ms)
  3 Ag of the pati nt i more than 40 y ars
  4 Failur of respon Th re is failur of clini al and x ray e ponse aft r not l ss than 3 and not mor than 4 weeks of intensi e medi al the apy (ee below)

ACUTE PHASE

T e tm nt
A Ge e l M sure
  1 R st (phy cal and mental) Tre patie t should have 2 or 3 w eks rest fr m wo k if p s ibl If the home itu tion is n ati fa tory or unpl asant o if coop ration of the patie t i unsatisf tory ho pitali ation is r c mmended If pati nt s finances a l mited it m y be nec ssary fo him to contin e wo k during t eatm nt In s ch case it is *esse ti l that he be gi en careful in tructions regarding the* carrying out of the medi al program under the giv n wo king onditions When possible ar angement should b mad for r st p riods incr s d ho s f leep and for any oth r fa t s which e d to be modifi d in the pati nt s home o w rking enviro me t
  2 Ori ntation The patient should be advis d as to th chroni curr nt n tur as w ll as to th pot tialiti s of the dis e se Do not emph size can er a a c mpl cation of th disease
  3 Psychoth r py Anxiety p oducing mech nism should be r liev d whe ev r possibl It is r ot usu lly wi e to insti tut acti p ychother py during the ac te phas of th ill ess (se pag 36)
  4 Alcohol and tob cc mu t be avoid d

5 Avoidance of certain drugs (e g corticotropin (ACTH) a d the cort sones) Recrudescence of symptoms and even perforation and hemorrhage may occur in pat ents with p ptic ulcer during the course of administration of corticot opin (ACTH) and the cortisones This hazard sh uld always be considered The mechan sm is not known

B Diet

1 *A wide variety of diets are available but the S ppy d ets* or modifications of these are probably the most eff ctive (see page 54) The patient should learn the princ ples of his d et and should be taught to be careful of his d et for the remainder of his life Rich spicy hot and coarse parti le foods should be exclud d from the diet pe mane tly Regular and frequent h gh protein meals with proper mental attitude during meals should be emphasized as ess ntial for suc essful results from d t The length of time the patient should remain on each phas of the diet will d pend on num rous factors namely

a *Severity of symptoms*
b Treatment situat on e g Sippy l d t d es not meet the nutritional requirements of the hard laborer Addit onal *food is essential*
c Intellig n e and cooperativ ness of the patient
d Resp nse to treatment

2 Avoid short cuts In g neral most of the sh rt cut or *so called modifi d methods do not ultimat ly save the* patient time In many cases they not only fa l to provide the n c ssary r l ef of symptoms but also actually serv to length n th p riod of onvalesc nce The psy holog cal mportance of a st ict d etary r gimen in th acut phase s of great importan to pept c ulc r patients espe ially t new patients sin e these pati nts w ll oth rwise fail t *rec gnize the importance of diet in the long term care of* th ir disease Pati nts on short ut d ets become sloppy and lackadaisical and indiffer nt to the potentially *s rious n ture of th ir illn ss Unfortunately there is n* unanimity of opin on among linic ans regarding th matter of diet in pepti ulcer

3 Prot in *hydrolysate solut ons o s milar commer ial pro* tein preparat ons may b used to s pplem nt the Sippy diet espe ially when it is ne essary to redu e the fat intak Boiled cow s m lk prot in p epar t on or goat s milk may be substituted in ndividuals intol r nt of cow s milk

4 Re tri t ons Me t extract bran raw egetables and f uits fried foods ondim nts spic s alcohol coffee tea and carbonated bev r g s

C Drugs

1 Anta ids It is difficult to state whi h of the m ny anta d available are m t ffe tive since in rtain cir um tan es ea h of the ag nts listed bel w joys p ial dv nt ges Som clinicians f el that anta ds re f littl o no v lu in th well m naged patient In ge eral th ren e t a suit *able diet ry regimen d p oper e of nti holinergi drugs* will either obvi te or d ease the need fo anta ids *All patients on antacid therapy should be watched for*

diarrhea constipation alkalosis and fecal impaction

Anta id p wders are prescrib d on var ous schedul s a cording t th stage of th diet During the early st ge of th Sippy regimen th powd rs a g v n on alternate hours or h lf hours during th day and ev n at night if n cessary The interval b tween powders may th n b l ngthened ac cording to clinical and x ray evid nce of mprov m nt For more prolonged us th powder are usually administered 2 hours p c and p r n Magn s um oxide is a laxative drug and alcium arbonat tends to produce constipat on

a M gnesium Oxide U S P B P and Cal ium Carbon t U S P B P

℞ M gne ium ox d 30 60 0 ʒi i
Cal um carbon t q s ad 120 0 ʒiv

Sig Take ½ 1 tsp in half glass of wat r as directed By varying the magn sium oxide in th above p wder th laxativ or con tipating effects of the 2 ingr dients may be ffect ely balan ed Th powd r may be given in alte nate dos s with the aluminum hydrox de gels (s below)

b M Bi Cal (magne ium bi muth alcium) mixture

℞ Magnes um oxide 20 60 0 ʒv ii
Bi muth subcarbon te 20 0 ʒv
Calc um ca bonate q s d 120 0 ʒ v

Sig ½ 1 tsp in half glass of water as d re t d Th b smuth incorporated be aus of t oothing coat ing ffe t thi powd r occasionally off rs r lief wh n the magn sium oxid cal ium carbonat powd r fail to re li v

Magne ium T i ilicat U S P B P ½ 1 tsp n half gla s f wat as d r ct d An ex ellent non systemic antacid with unu ual prote ti e properti s

d Aluminum Hydr x de Gel U S P (Ampho) l® Creamalin® etc) The e ag nts have rec ntly enj y d popular u e b caus of con en ence of administration r lati fr dom fr m indu t on of alk l s s and be ause of l al adsorb nt protect ve and demulcent action How v r they a onst p ting nterfere w th ph sphate and vitamin ab o p t on may quire large doses and occa on lly fail to gi lief

(1) Aluminum hydroxid gel liqu d 1 2 t p in half gla s of wat r very 2 4 hours p r n

(2) Aluminum hydrox d gel (d d) tablets chew 1 2 tab lets and f llow w th half glass of wat very 2 4 hour p r n The e tabl ts are sp ally onvenient for pati nts who ar f d to ntinu work r to tra l

(3) Aluminum hyd oxid g l magnesium tr sili ate mix tures liquid (G lusil® Tri ream lat ® t) 1 2 tsp in half gla of wat ev ry 2 4 hou s p r n Th ad dition of magn um tr silicate increas s th n utr l i ing pow and prot ctiv oating action of the alum num hyd oxid g l Thi mixtur is also less consti pating

(4) Aluminum hydroxide gel (dried) magnesium trisilicate tablets chew 1 or 2 tablets every 2 4 hours p r n and follow with a half glass of water

2 Sedative drugs The use of sedative drugs will depend on th emotional status of the patient Tense and apprehensive p tients will usually profit greatly from proper sedation Most patients with peptic ulcer prof t by sedative drugs Th barbiturates are the preferred sedatives They may be u d alone or in combination with antispasmodic drugs Hypnot c doses of the barbiturates may be necessary to insure sleep during the acute phase of the ulcer (see page 39)

3 Antispasmodic antisecretory drugs

a Belladonna preparations when employed in proper dos ge are probably as effective as any of the many new anti cho inergic preparations and have the added advant g of being inexpensive

(1) Belladonna Tin tur U S P B P 0 3 0 6 cc (5 10 d ops) in half a glass of wat r orally t i d 20 30 minutes a c and h s p r n (0 6 c of the tincture equals about 0 2 mg of atropine) This pr paration perm ts rather d licate titration of desired antispasmodic effe t by simply regulating the number of drops

(2) B lladonna Extract U S P B P 8 15 mg (1/8 1/4 gr) tablets or c psules orally t i d 20 30 minutes a and h s p r n (15 mg equals about 0 2 mg atropine alkaloid)

(3) ℞ Belladonna tincture 10 30 0 (℥i ss ℥i)
Elixir of phenoba bital q s ad 120 0 (℥iv)
Sig 1 t p in half glass of water t d 20 30 minutes a and h s p r n

(4) ℞ Belladonna extract 8 15 mg (gr 1/8 1/4)
Phenobarbital 15 mg (gr 1/4)
Sig 1 tablet t i d 20 30 minutes a c and h s p r n

b Ant choline gic antispasmodi drugs M ny new and ffe tive but relatively xpensive gents are ava lable Th se drugs as is the case with belladonna are given t i d q i d and should generally be given in dos ges larg enough to produ e some oral dryn ss Although th y are said to be r lat vely fre of side eff cts it b st to wat h for blurred v sion diffi ulty in chewing consti pation and urinary r tention

(1) Adiphenin hydrochlorid (Tr sentine®) 75 mg (1 1/4 gr)

(2) Methantheline Bromide U S P (Banthin ®) 50 100 mg (3/4 1 1/2 gr)

(3) Pr pantheline Bromid N N D (Pro Ba thi e®) 15 30 mg (1/4 1/2 gr)

(4) Oxyphenonium Bromide N N D (Antr nyl®) 5 10 mg (1/12 1/6 gr)

(5) Diphemanil M thylsulf te N N D (Prantal®) 100 200 mg (1 1/2 3 gr)

(6) Methscopolami e Bromid N N D (Pamine®) 2 5 5 mg (1/ 4 1/12 gr)

CONVALESCENT PHASE

T eatm t

A Re x min tion Wh n clinical qui scence of th lesion is vi dent (based on fr d m from symptom) a r p t GI x ray series dvi able to d te mine wh the or not the e is roe t g n evidenc of healing of the ulcer In the cas of g tric le sions failure of linical imp ov ment and x ay improv ment of the ul r crat r within a pe od f 3 4 w ek on a careful medi al egimen should be tak as uspic u evid nce of g t ı mal gnan y

B Edu ation of Pat nt Rega ding Recur n e

1 Th par ent should be du ated to an understanding f the chron ity and r ur ent pot ntialities f his ailm nt as w ll as of th dang rs due to complicat ons which may fol low n glectful improp r treatm t

2 Fa t s causing recur nc It should be mphasiz d to the pat nt that the f llowing f t rs ar mo t f qu ntly re sponsible for ecur n e of ul e

a Improper d t and ir gul r eating habit

b Irr gular living habit long or irregul hours Use of alcohol o tobacco

d Emotion l st ess

e Inf ct ons part cularly of the upper r spiratory t act

3 Manag m nt P t ts should be in tructed t return to the S ppy régime o to a modific tion th of in th vent of recur ce of sympt ms o even p ophylacti ally if they are expos d to condition known to aggr vat p ptic ulc r In additi n to di t information antacid and other m dication should b dily ilabl to the p ti nt

C R t and R ation Provis o s hould b m de fo p oper rest eat on vacat on and the lik to pr mote phy ical and m ntal r laxat on

D P ychoth rapy Sele t d pati nt should be con id r d for in t n v p olong d psychothe py

TREATMENT OF COMPLICATIONS

INTRACTABILITY TO TREATMENT

Although um ous cases undoubt dly xist where b nign p pt ulc fa l to h l desp te omp t nt m dical upe vi ion it is pr b bl that mo t a es of stubborn and p ist t ul a a re fl t on of an inad quat med al regime o of partial or mpl t f lur f ooperation on th part of the p t t Th factors p e viously me tion d as b ing sponsible for r u r nc of peptic ul ar oft n th ame fact whi h interf e w th the healing of ulc Th d ign tion int act bl should be erved only f thos p ti nt who ha be n gi n ad quat and upervised trial of the apy Th pos ibility of mal gnancy or f othe c mpli tions of th ulc (e g pylori bstruction perforat on gastriti te) must alw ys be consid red

HEMORRHAGE
(Stomach code No 640 951 7) (Duodenum code No 651 951 7)

Although peptic ulceration accounts for about 70% of gross hemorrhage from the upper gastrointestinal tract one must consid r the possibility of esophageal varices gastritis duodenitis carci noma of the stomach hiatus hernia and systemic bleeding diseases

Treatment

A Emergency Measures for Hemorrhage and Shock
Refer to page 28 for general management of shock
1 Hospitalize patient at absolut b d rest
2 Warmth Keep pati nt comf rtable If an ice bag is applied to the epigastrium avoid chilling the patient
3 Treatment of apprehension and anxi ty
a Reassurance by word and manner of physician that th condition is not ritical
b Rest Prov d prompt mental and phys al rest this can best be ach eved in the hospital
c Sedat on May be necessary
(1) Morphine should be avoid d if possibl since *it may cause nau ea* Do e is 12 15 mg (1/6 1/4 gr) subcut every 4 6 hours It is be t to substitute codeine pho phat 30 65 mg (1/2 1 gr) subcut or orally o dihydromorphinone (D laudid®) 4 mg (1/15 gr) subcut every 4 6 h urs p r n
( ) Sodium phenobarbital (s d um phenobarb ton) 0 03 0 1 Gm (1/2 1 1/2 gr) subcut or orally during the first 24 48 hours
(3) Ph nobarb tal (phenobarbiton) may be ontinued for s v ral days if ne essary
4 Oxygen Pref ably by ma k at 5 10 liters per m nute (see p ge 145)
5 Transfusions Th r has been consid rable ontrove sy e garding the use f blood tran fus ons in ble ding l er How ever it s g n rally agreed that th prev ous cons rv t e attitude (fe r that tran fusion may ra s th fallen blood pressur to a point a sing e urr nce of hemo rhage) is t warranted Certainly in s vere hemor hage the time rate and volum of blood administrat on should suit th physio logi al needs and l rg amounts of blood may b gi en when indicated Transfu ions must *always* be given f h mor rh ge is sev re (Hgb < 50% or RBC < 2 5 million) if imm diate surgery i contempl ted or f symptoms of ano ia or shock a e not rapidly ont oll d Slow and continuous ad ministration of 500 to 2500 or more of whol blood daily may b n essa y
6 Cl ic l and labo atory st di
a Take pulse respiration and blo d pre sure e y 1/2 1 hour sin th se data may g ve inf rmation regarding shock status in ad ance of blood chang s
b Observe all vomitus and tool f r gro s or o cult blood
c Type and cross mat h th patient s blood a efully a soon as possible Have whole blood o pla ma av ilabl without delay

d Obtain compl te blood ount and h matocrit initially and s rially a indi ated
e Obtain blood N P N or urea itrog n for comparison with late studies

B G 1 M r

1 Co ect d hyd at on and s lt d pletion
Hypodermocly is Physi logic saline solut on 1 0 1 5 lite s daily by thi method
b Oral liquid f edings as oon as tol r ted (see below)
c Sodium chloride 3 6 Gm (3/4 1½ dr) may be added to each lite of l q id food mixtur to p vent salt d pletion

2 Nut tion
a Starv tion The policy of initial st rvation is subject to con derable controve sy Since the p t ent is often naus ated and ano e ic o even in sh k on the fi at day food m y be safely withh ld
b Fluids If pat e t is n use ted o vom ting thirst m y be ont olled by fluids given par nt rally Th pat nt may be pe mitt d to d ssolv ice h ps or hard f uit flavored candy und r the tongu to relieve thirst
c D et If the patient is hungry and not vomiting it is wis to begin immedi t admini tr t on of bland food tuffs
(1) L quid diet It is best to begin with a liquid d et of hou ly fe ding of milk and ream mixture (s e p ge 52) ing upplem ntary antacid powde s Th ee to 6 Gm (3/4 1½ dr) of odium chlo ide may be added to ach quart of milk cream mixture to pre ent salt deplet on
(2) Solid bland foods
(a) Conservative appro ch Solid bland food may be add d whe the pati nt has shown ppar nt clinical improv ment on the liquid (milk and eam) r gi me w thin 1 2 weeks and when th pati nt s stools h v sh wn no cult blood f 2 3 days
(b) Libe al app oach (g M uleng acht) This m th od permits umm diate f ding f all on irritant high loric foods but in pur ed f rm

C Conval sc t Care. Following the a te episode the con rva t v med l regim n such as outlin d f uncomplic t d pepti ulce (s e pag 263) should be instituted

D S ge y S rgery hould b con id d if
1 Th general onditi of th patie t f ils to improv de pite th ab meas r s
2 Bl ding p sts as evide d by gr ss o occult blood in stools If the patient s ond tion p rmits a g str int stinal x ray i s should be pe formed to h lp localiz the ource f dentify the ct ter of th ble ding le ion Manipulat on du ing s ch aminations should be a gentl a pos ibl If oph g al va ic are liminat d as a us of bl ding and th bl ding pe ists f more than 2 3 w k p pa the p ti t p omptly fo surgi l inte tion D not wait until the p ti t becom a poo operati e i k before making this de isio

PYLORIC OBSTRUCTION (code No 618)

It is important to differentiate pyloric obstruction due to spasm and edema from that d e to scarring The former condition may respond to medical treatment whereas the obstruction due to scar ring is a surgical problem

Tr atment

A M dical M asures (for obstruction due to spasm or edema)

1 Bed rest preferably in the hospital
2 Liberal use of antispasmodics (see pag 258)
   a Oral If patient is able to retain oral medication
      (1) Tincture of belladonna 10 20 drops t i d or q i d
   or (2) Belladonna extract 15 mg (1/4 gr) t i d or q i d
   b Parenteral If the patient is unable to retain m dication by mouth atropine sulfate 0 3 0 6 mg (1/200 1/100 gr) t i d or q i d subcutaneously
3 S datives
   a Phenobarbital (phen barbitone) 15 30 mg (1/4 1/2 gr) t i d q i d
   or b Phenobarbital sodium (phenobarbitone sodium) 0 065 Gm (1 gr) subcut every 8 12 hours p r n
4 Nutrition
   a Sippy I diet should be used initially gradually progressing to Sippy II III and IV as tolerated (see page 54)
   b Fluid or mineral imbalan e must b orrected if vomiting is severe or pr longed Parenteral method are most satisfactory (s e pag s 7 and 24)
   c Hypoproteinemia must be corrected sinc the resultant edema may increase pylorospasm
5 Control of hyperacidity
   a Gastric secr tions should be aspirated every morning and n ght with a small gastric tube Some clinicians feel that continuous gastri suction should be employed initially
   b Antacids may be employed as for tr atm nt of uncompli cated ulc r (see page 264) but *avoid* alkalosis from ex cess ve use of soluble antacids sinc this increases pylorosp sm

B S rgical Measure (for obstruction du to s arring)

1 *Surgery is to be employ d only when a thorough trial of con servative measur s has failed*
2 The various recommended surgical procedures will not be dis us ed It is curr ntly the pra tice to perform gastric resection in most cas s although som surg ons favor gastroenterostomy

PERFORATION DUE TO ULCER
(Stomach code No 640 951 3) (Duodenum code No 651 951 3)

Acute suba ut and chronic perfor tion of peptic ulcers may occur Acute perforation constitut s a medical emerge cy Imme di te surgical r pair preferably by simple surgi al closure is in dicated More exte sive op ration are gen r lly unwise at th time of the acute episode becaus of the increas d operativ h zard due to the patient s u u lly poor physical condition If the p ti nt has be n re eiving orticotropin (ACTH) or cortisone these drugs must be discontinu d If the patient ha h d no pr vious th rapy or if pr vious therapy has be n inadequate he may then be pl ced upon a conser tive medical regimen If the patient has had an ad quat trial of th rapy prio to th epi od prepare him for po sible further extensive operati e procedur s by transfusions and other s pportive measure The tre tment of subacute or chronic p rfor t on m y be m di al or surgical depending upon the presence or abse c of compl cations (g abscess involvem nt of neighbor ing vis era) or upon the persist n e and seve ity of symptoms

GASTRITIS (code No 640 3)

Th stoma h may become acutely or chronically inflamed due to a wide vari ty of specifi and nonspecific auses Th symptoms of g str tis are poorly d fined and variable It is n t unusual to hav an abs n e of symptoms when present they lo ely r semble the symptoms of pepti ulcer

Physical xamination is usually not diagnosti X ray findings ar not remarkabl unl s th gast tis i compli ted by atrophi hypertrophic c rrosive o sclerosing chronic changes

Gast ic a idity may be d cr as d in the hronic forms of gas tritis and blood may be obs rved in the gastric conte ts and in the f s G str scopi visu lization may reveal ha act ristic mu cosal hang s which form th basis for linical clas ification of gastritis Patients with pernicious anemia who hav atr phic gas tr tis must be observed car fully and periodically for vid nc of m lignant d gene ation of polyps

T atm nt

A Ge e al Me s res. A di tary and drug treatment program ess tially similar to that employed in peptic ulcer is useful (see pag 264)

B Spe ific M asu es Remove o eliminat specific cau ative and aggr vating fa t s (g infection alcohol, tob c o)

GASTRIC MALIGNANCY
(Carcinoma of the Stomach) (code No 640 8)

Carcinom of the stom ch sh uld be uspect d in all p tients o er 45 years of age who dev l p dysp psia This diseas occur mo e commonly in m n than in wom n Lesions occurring in the r gion of th greater curvature and prepylo ic are s a usually malignant A high index of suspicion, car ful x ray g stros opic

studies and gastric analysis afford the greatest opportunity for early diagnosis Unfortunately by the time the disease is manifest me tastases usually have occurred and the lesion is no longer amenable to satisfactory surgical therapy

Treatment

A *Specific T eatment (correcti)* Early and tho ough g stric *resection is essent al if the patient is a good operative risk* Patients should be afforded the opportunity of correct e sur gery regardless of the apparently advanced nature of a malig nant lesion

B *General M asur s (palliative) To be considered only when* corrective surgery is impos ible
   1 Simple shunting procedures (e g gastroenterostomy) n th event of pyloric obstructi n
   2 *Symptomatic and supportive treatment* as indic ted
   3 Narcotics should b given in ad quate doses to alleviate suf f ring (s e page 33)

DIAPHRAGMATIC HERNIA

(Congenital code No 275 037 9) (Traumatic code No 274-424)

Herniation of a port on of the bdominal vi cera *through a con* genital or a qu red d fect (specially esophag al hiatus) f the dia phragm may be manife ted by a wide vari ty of sympt ms but clas ically by epigastric distress and dysp psia noted sp cially on lying down after meals Nau ea vomiting small h mo hage and angina lik symptoms m y occur X ray *demonstration* of the hernia is usually n c ssary to confirm the di gnosis Small e phageal hiatus hern as wh ch are of qu stionabl clinical signifi canc are r ported (*r quently (t l ast 10%) on routine x ray* ga t intest nal ser es

T e tm nt

A Treat f r fun t on l dysp p ia (*see p g 260*)
   1 Small frequent f dings of bland e sily tolerated food
   2 Antispasmodic sedat ve m di ation (see page 266)
   3 Ant cid powders f equently provide reli f from h rtb n (see p ge 264)

B In tru t to P ti nt
   1 Patient should be instr cted to
      a *Avo d lying down immediat ly after eating*
      b *Avoid ex rci ing vig ou ly aft r e ting*
   2 Pat ent should be advised to sl p in th sem Fowler po i tion, or at le at with upper part of body slightly lev ted in an attempt to decr ase acid r gurgitation into th es phagus

C S gical Treatm t Corre t on of th h atal def t s n ex t iv rg l procedur and ho ld b on id r d only if th symptoms are prog essiv s rio s d fail to r p d t o servative medic l management

DISEASES OF THE INTESTINES

REGIONAL ILEITIS (code No 6з4 952)

An cute o hronic inflammati n f the distal p rtion of the sm ll int stin charact riz d by ul e at on and scarring and often as c at d w th internal and external f stul e The ondition must be diffe enti ted f om othe specific causes of nteroc l tis (g tub rculos s chron c bacillary and am bic dysent ie) Th his t ry ften of long durat on s one of mild int rmittent diarrhea and abdominal cran ps reli ved by bowel movem nt The acut form may simulat app ndic tis

Phys cal findings may include tender masses in right or left lower quad ants fistulous t acts and perire tal abscesse O cult bl od is often pr s nt in the w te y stools Ga trointestinal x ray seri s (small bowel stu ly) rev als a loss f th mucosal pattern with n rrowing and irregularity of the te min l ileum (" st ng gn ")

T e tm t

A Correct e Radı al prim ry r section of the involv d por tion f tl e b w l is the pro dur of hoice after a eason bl p riod of c nservativ medi al therapy ha b en t i d D sp t extensive au gical t eatment th disease will re ur fairly oft n

B P ll at v

1 D t Bland h gh alor h gh vitamin adequate in pro tei s
2 Symptomatic tr atm nt of anem a d arrhea avit min sis as ind c ted
3 Sulfonamid s and antib otics Although of doubtf l value tho sulfon m d s whi l ar poo ly ab orbed from the g s t nt stin l tra t m ght be g n t i l (e pag 500) The ff ct v n s f tr ptomycin and chlort tr cycline (Aureo- myci ®) h v n t be n compl t ly e aluated
4 Co ticotropin (ACTH) and th cortis nes m y produ e ben f al r s lt in ertain p ti nt w th regional e ter tis but results h v b n quite variabl and g n rally not too e c ur ging Exp ri n e would ind at that lo g term use of th s ge t may not be w thout hazard and may result in incr ed d stru t on of inte t al tissu s
5 Palliativ surgery Short circuiting op ration m y be cess ry wh n involveme t is extensive and c mpl at d

DIVERTICULOSIS (code No 660 642)
DIVERTICULITIS (code No 660 642 0)

M lt pl cqui ed or ongenital e aginat o s (pouch lik pro jecti n) may cu at any place long th ou e of the bowel sp ci lly th c lon In dive t culosi th le ion are a ymptomati and r d ov d cc d ntally on x r y xamination Inflammat on of d v t cula (d rticul tis) with ymptoma of int a abdominal in flammat on ref abl to the involved sit o curs mainly in indi vid als above 40 yea s of ag Va iabl lowe g st t tinal symptoms oc ur depending on location of d erti l Abdominal p in and te d rness f r and b w l di turbance qui d ff r

entiation from acute appendicitis Laboratory evidence of inflam mation may exist and x ray demonstration of diverticula helps to confirm the diagnosis

Treatm nt

A G ral Me sures Conservat ve medical t eatment is the method of cho ce
1. Bland diet as tole at d
2. Anticonstipation measures (see pag 254)
3. Coating agents Non const pating antacid coating powders and gels vegetable oils (olive oil) mineral oil or vegetable gum laxatives may be used (see page 255)

B Surgical Treatment May be indicated in the event of compli cat on

ULCERATIVE COLITIS (Nonspecific) (code No 660 951)

An acute or chronic inflammato y di ease of the colon of un determined caus it r sponds poorly to treatment and has a st ong tendency to chron city and r urr nces Symptoms include (1) dis *turban s of lower bowel function with eithe dia rhea (usual)* or constipation and w th blood or bloody mucus in the stools and (2) systemic d sturbances anor x a weight loss a then f ver an mia and ev n profound debil ty

Proctoscopi examination reveals a diffu superficially ulcer *ated ble ding mu o a The presence of specif infe tious organ* ism should always be ruled out by agglutination t sts stool exam ination fo ov and parasites and stool cultu e Ba ium en ma x ray ppearan is that of decrea ed olon c calib r loss of hau t al marking nd indistinct outl ne of th colon c mucosa

Treatment

A G neral M asu s
1. Rest Bed re t is adv sabl usually only in the acut phas Adequ te rest p riods can f m an ffective part of the daily routine of mo t patients
2. Nut ition
   a. Di t The di t should b bland yet as ppeti ing and nu tr tiou as po sible A bland high lor e high protein h gh vitamin diet is ommended When ano exia i marked it is perm ssible at tim s to use other than bland foods if the patient so desi These pati nts can oft n tolerate me t fai ly well
   b. Elimination diet If llergic f tors are susp ted elim ination d ets may b employ d to ad ant g
   c. Supplem nt ry vitamins may be administered pe ially if nutrition is ma kedly distu b d
   d. Ferrous sulfate 0 2 0 4 Gm (3 6 gr) t i d p c may be used to comb t hypochr m c an mia
3. Psy hoth rapy Th exa t role of p ychog ni f ctors has not been det rmined Certain personality type appa ntly are predisposed to the illness *In any cas anxiety produc* ing m chanisms should be v l at d wh pos ibl (see page 35) Thes patient n d consid r t u d standing and e assurance

4 Sympt matic and supportive tr atment
a Diar h a The va i us antiperistaltic agents employ d for any chronic diarrhea may b used (s pag 258) Use of n rcotic d ug hould be avoided if possibl ex cept for sev e cute diarrhea A tispasmodic d ugs ar often of value (s p g 266) Metamucil® or other v g table mu l g s h ve been s ggest d to inc e th bulk of the stool
b Nau ea and v mit g (ee page 251)
c C mps or t nesmus Hot w ter bottle to the abdom n and s d ti e anti pasmod c m d at on m y be employ d
d Hypoprot in mia Thi is b st c r t d by high protein d et when r l f ding are w ll tol rat d P otein hy d olysates dissolv d in ceptable liq ids such as milk fru t ju ce broth etc m y b us d to upplement th d t y protein when indicated If hypop ot inemia is mark d and annot b orr cted by dieta y m a es blood plasma or whole blood t an fu i ns may b n a y
e Ble ding tendency (due to hypop oth ombinemia) T at me t w th menad o o oth vit mi K p p ati s (s p g 61 a d 226) may b i dicated
f N rv ness In add tion to g ne al psychoth p uti m ures m tioned above mild sedat on is often n c s s y Th s pati nts ft n do w ll on th va ious anti pasm d edati mixtures (s p ge 266)
5 Anti inf ctive age t Th s hould not b onside ed to be sp if or cur ti e in thi di eas However g od ults and prol g tion of mi s ons h e be n ported by some obs v
S lf namid Many p p at n have b u d I g ner l ulfonamid whi h a e poo ly b o b d f om th g t intesti al tra t e pr f r d S c inyls lfa thi le U S P (S lf uxidin ®) and Phth lyls lf thia z le U S P (S lf thalid ®) e m to njoy at l st nt p f ce Ob r th u ual p a tio s f ulf nam d s (e page 500)
(1) S lfas xidin ® 3 0 Gm (45 gr) very 4 hou (Should not b u d if th patient h di h a)
(2) S lfath l d ® 1 5 Gm (22½ g) ev y 4 hours (Thi dose m y be doubl d in cas s of ver d he)
b Ant b ti s Th tet acy l d ugs hav be n mploy d but are of qu stionabl v lue Or l penicillin is of little o n lue Chlort t acy lin U S P (A eomy ®) is p rt d o the b sis f limit d experi c to b b e f ial wh n giv n in d s of 2 4 Gm ally d ly for ours of 4 6 w ks Oxyt t yclin U S P (T a my n®) and Chl ramphe l U S P (Chlo omy ti ®) a p obably abo t as ff ti as hlo t t a y line
6 C tic t pin (ACTH) and th o tiso s a e kn wn to induc remis ions m tan e ful ti e ol tis Th y ar s ly ti e but m y indu tempora y s pp e s on of th infl mm t y xudative p o Thei us may be on sid red in th e c rcum tan wh clin cal contr l is diffi ult and th s tivity of the di e s is i t rfering w th oth t tment m ur s

Optimum dosage schedules ha e not been established f r *these drugs* They are usu lly given in courses during exacerbations Th y should be adminıst red ın hıgh doses and gradually reduced as symptoms d sappear (For d sag s see page 423) Reports ınd cate that acti it recurs when the drugs are discontinued b fore onset of th natural cyclical remission phase It seems the drugs are used most profit ably as adjuvants in the co trol of acute ex cerbations of th disease and should probably be avo ded *for* long term use

B <u>Surgic l Measures</u> These h uld b used only after careful prolonged m dical the apy fails This does not mean that the patient should be terminal or a poor operative risk before operation is consider d The choice of surgical proc dures w ll not be discussed her Subtotal or total colectomy may be employed initially or resorted to only after an extended tr al of ileostomy or colostomy

BACILLARY DYSENTERY (code No 660 116)

Bacillary dys ntery ıs an a ute or hronic ınfection with the dy entery (Sh gella) group of bacilli involving primarily the col n It is charact ri ed by diarrhea abdominal cramp t nesmus and sigmoid tendernes Stools contaın blood pus mucus and micro *scopi* larg non m t le m crophag s (ot mebas) *Stool cultur s* are positiv during th f rst week aggl tination tests ar positive during the second week The important bact riological and clinical types include

Organism	Distri bution	S verity	S g ficant Agglutin	Fe m nt ti	
				L ctose	Ma nitol
Shigel a shigae	Tr p cs and sub tropi s (epid mic)	Seve e	> 40		
Shigella ambigua					
Shigella flex eri	World wide	M ld	> 160		+
Sh g lla son e			> 320	+	+

<u>Tr tm t</u>

A <u>Emergency M a es</u> For severe as s

1 Isol te pati nt and use all ontagio s di as pr cauti ns
2 Overcome dehydrat on and el t olyt imbalanc by the liberal us of s lin and dextro e solution I V a d when ne essary the us of potassium solut ons (s pag 22) Urinary outp t should be kept at 1000 1500 c (1 1½ qt) per day
3 W tch for circul to y oll pse and shock in s ver ase (se page 27)
4 Stool examination Obtain specimen for micro copic xam ination and cultu e to det rmine c usative o g n sms

B *Specific Measures* The ulfonamid s h e be n co idered effi a io s in th treatment of b illary dyse teri s b t the

broad sp ct um antibioti app ar to be ga ning in favor There is a significant variation in respo se of specific organisms in d ffere t individual S rum treatment is probably indicat d *only* in se ere a ute Shigella inf tions and is used to combat th toxin ot th infectio

1 A tibiotics Administer tetracycline drugs and chlo amphen i ol in dos s of 0 25 to 1 0 Gm ery 6 hours
2 Sulfonamides *Observe the u-ual precautions for s l-fonamides and watch for signs of possible toxicity* Sulfadi ure is consider d the drug of choice Give 2 4 Gm (30 60 gr) Stat with equal or doubl quant ties of sodium bicarbon te and follow with 1 2 Gm (15 30 gr) every 4 hour p r n If diarrhea is sever larger d ses by mouth or the use of sodium sulf diazine par nte lly may be ne ess ry
3 S rum tr atment Administer sulfon mid or broad spectrum antib otics simulta ously
   a Bacillary dysentery polyvalent antitoxin s rum (not anti bacterial) Test for sensitivity and administer 30 100 cc d luted tenf ld in s line solution I V t i d until th toxemia l ov r om
   b Shiga antitoxin s rum Admir ist r as above in dos s of 40 80 cc in 00 of physiologic saline solut on 1 V b i d

C C neral M s e

1 Is lati n D sinf t all body d cha ges d ty b d l n ns ar d b d lothing
2 B d rest When d arrhea i s vere and patient is w ak it may b advi able to ha e th pati nt d fec te on disp sable abso bent pad o she ts to vo d the physi al exertion necessitated by e of the bedpan
3 Init al purg tion Controv rsial and probably not ad i able
4 Ca eful rectal hygien
5 Local heat t bdom n p r n pain
6 Sedati n
   Ph nob rbital (phe obarbitone) 15 30 mg (1/4 1/2 gr) or ily t d o q i d
   b Pentob rbit l sod um (p nt b rbit ne sodium) 0 1 0 13 Gm (1 1/2 2 g) orally p r n
7 Narc t s
   a Codeine Phosphate U S P 15 65 mg (1/4 1 gr) orally or ubcut p r n pain
   b C mph r ted T ncture of Opium U S P (p r goric) 4 8 (1 2 dr) as n ssary fo p in and fr q ent loo bowel movements
8 Atropi e Sulfate U S P 0 3 0 6 mg (1/200 1/100 gr) ally o sub ut for r mps
9 Fluids Ad qu te fluid intak by or l nd p ente l rout s should be fo ed to l m t of tol ran e as indi ated Total or l fluid intake should pp imate 3000 c (3 qt) in the cute phas On or more lite s f parent ral aline olution daily m y be n s y to r plac fluid and alt loss in pro fus d arrh a

10 Nutrition *Avoid starvation diets* However in sev re cases patients should not be allowed to eat a normal d t for 1½ to 2 months after the acute phase G e parenteral feedings if necessary Evaluate bowel symptoms before adding the various d etary constituents

a Early acute stage Feedings of clear broths rice water albumin wat r tea with l ctose barley water or apple juice (not cider) at frequent intervals

b Late acute stage Gradually add as tolerated boiled milk cereals and strained fruit juices toasted soda crackers or bread and gel tin desserts

c Subacute stage Gradually add as tol rated mashed potatoes boiled rice boiled chicken soft cooked eggs l an fi h s raped beef custards and puddings

Ch onic Ba illary Dysentery

The linical manif stations and treatment of chronic bacillary dysentery are similar to those of chroni ulcerat ve colit s (se page 274)

FOOD POISONING

The term food poisoning ordi arily ref rs to the ac te in toxication which results from the noxi us agents or e terotoxins p oduc d by bacteria This is in co trast to gastro ntest nal d s turbances whi h ar actually the result of infection of the gastroin t stinal tra t with microbial organ sms (se p ge 276) or which are d e to po sons of veg table animal o ch mical origin (see pp 530 to 546) *Food polso ng is a re ult of poo food hygi ne* either in preparat on pro e sing sto age distribut o or handli g S s p cion of food poisoning hould arise in instances of febrile gastro i te tinal disturban e of acut o set especially when more than one indiv dual in a family gr up or c mmunity is involv d A ca eful hi to y a d olle tion of spe imens f s p cted food vom itus and stools fo labo atory study m y be indi ated Report ng to local health authorit e is ssential

Tre tment is symptomat c and supportive except in botulism for wh ch specifi a tito n s indicated P rform gastric lavage and withhold food sedatio and par nt ral fluids Liquid a d soft diets (e page 46) a e indicated n convalesc n e

Organism	O s t After I ge tio	S v ty	Tre tme t
Clo tridium botulinum	12 24 hours	V ry e r oft n fatal	A t t (ee page 473) Symptomatic and uppo ti
St phylo occus aure s	1 6 ho rs	May b e e u lly re ov in 1 4 days	Symptomatic nd supporti e (e pp 252 and 258)
Salmonella ent ritidis	8 24 ho rs	May b e us lly recov r in 1 2 days	
Streptococcus fa calis	5 20 ho rs		

HEMORRHOIDS (Piles)

(Internal code No 66x 641) (External code No 67x 641)

Treatm t

Treatment is dire ted at th 3 common st disturbing manifes tations bleeding prolapse and pruritus

A Gen l M sur

1 Control constipation (see pag 254) Mineral oil 15 30 cc ($1\frac{1}{2}$ 1 oz) h s and in early a m may be especially effective

2 Use of soft toilet t ssu s slightly moistened with water and good re tal hygiene are ess ntial

B Specifi M as r

1 Ble ding

a Palliative m asures

(1) Local ast ingent suppos torie

( ) Tannic acid supp sitories 0 2 0 3 Gm (3 5 gr)

(b) B muth subgallate suppositories 0 3 0 5 Gm (5 $7\frac{1}{2}$ gr)

(2) Bed rest if necessary

b Surg cal m asures Inject on or removal as indic t d

2 Pr laps

a Palli tive measu es

(1) R placement of prolapsed hemorrhoid with lubricat d finger to prevent strangulation pati nt in l teral r cumbent po ition

(2) Warm sitz baths 20 30 minutes t i d or q i d

(3) Local lubricant (petrolatum) to anal region

(4) L cal an the ia (e g Nuper aine® or ben ocaine) sed tion and analg ia p r n

(5) Bed rest if pos ible

b S rgic l m asures as indi ated

3 Bu ning and itching (ee pag 80) Lub icants and lo al anesthetic ointment in addition to above g n ral m asures

CARCINOMA OF THE COLON (code No 680 8)

Carcinoma of th c lon should always be su pected if patient is mor than 40 years of age has had chang in bowel habits ectal pain or bl eding or has unexplained a emia Ve ify by digital xam in t on (pos t v in 50% of ca e) sigmoidoscopic examination (pos itive in 5%) and fo lesions higher in th colon by bari m nema

Ea ly u gical resection may be corre tive If the lesion is in ope abl tr at sympt matically fo constip tion a mia p in etc

DISEASES OF THE HEPATOBILIARY TRACT

INFECTIOUS HEPATITIS (code No 680 100)

An acute infe tious di e se d e to an unknown filt able age t It is haract i ed by (1) prodromal symptoms of anorexia malaise n usea vomiting abdominal pain light f ver and heada he for 1 7 days (2) sub quent dev lopm nt of varying d gr s of ict rus

bilirubinuria for days or we ks and (3) convalescent period of weak ness and easy fatigability for days o weeks The epidemic type has an incubation period of 3 6 weeks The homologous serum type usually has an incubation period of 3 4 months Infect ous hepatitis may terminate fatally

Differentiate from influenza inf ct ous mononucleosis malaria, cholecystitis yellow fever leptospirosis drug intoxication qu n cr ne (Atabrine®) discolor tion and carot nemia

Treatment

A Cen ral M a u es

1 Bed rest is absolutely nec ssary until the initial acute symp to ns have subs ded and should be maintained jud clously un til ther is no longer l ni al or laboratory evidence of th acute dise s Absolute bed rest beyond th mo t a ute phase is not warranted The return to activity during the conv lesc nt pe iod should b gradual

2 Nutrition *Keep a close check on patient s actual intake and output*

a Fluids and liquid foods If pati nt is unable to take or r tain food or fluids by mouth

(1) 5% glucose solution sho ld be g ven I V with 5% pro t in hydrolysate as needed to maintain nutrition and fluid balance Sal n infusio s e to be u d only t corr ct unusual lo s of chloride by vomiting etc

(2) Tub feedings of h gh carbohydr t formulas and sk mmed milk as giv n below (and on page 59) should be u ed if vomiting i s vere or protracted

(3) The use of ir adiat d plasma has been r commended but it i doubtful if pr s nt ir ad ation methods are effective in v ral sterilizat on Parenteral adminis tration of protein hydrolysate o salt poo albumin may be ne essa y to maintain nitrogen balan e

b R st i ted solid foods When patient appetit improv s small frequent oral feeding of any of th f llowing may be instituted as tol rated

(1) Fruit juices f rtif d with glu o e ev ry 2 3 hou s

or (2) Powdered skimmed milk in chilled wate e ry 2 3 hour

or (3) ℞ D xtrose 6 8 Tbsp (90 120 c)
M lk 1 Quart (960 c)

(4) S pplementary v tamins part cula ly of the B complex may be incorporat d to advantage in th feedi g sch dule if toler t d

c Full di t As soon as th pat nt is able to eat an ade quate d et provid a high CHO and high protein diet (s e page 58) and supplement ry vitamins f the B compl x

d L potropi ag nts su h a holine ysti or m th onine are of d ubtful v lue

e *Avoid* physical exertio nec s ary t n po tatio alcohol all medicatio whe e r po sibl espe ially barb turates morphine and sulfonamide and s rgery *especially with general ane thesia*

3 Corticotropin (ACTH) ha been r po ted to app rently x t a favorable *effect on the progr* ss in ert in cas s of acute hepatitis *Experience has been limited*

hazards of corticotropin tr tm nt in liver disease must be consid d (se pag 423)

B Prophyla is
1 I olat of inf cted individuals is recomm nded Human immune globulin 10 c 1 M may prevent or amel orate th dis ase if given to exposed subj cts d ring the incub tion period
2 A oid unnec ssary transfusions spec ally of possibly in fected blood serum or plasma

CHRONIC HEPATIC DISEASE
(Laennec s Cirrhosis code No 680 956)
(Following Acute Degeneration code No 680 952)

Etiol gy
Industrial chemic ls hepatotoxic drug lcohol (in exc ss) ute (viral) h patitis chronic infe t ns chron c biliary tra t d sea chronic malnutr t on (se nd y) co g ti e failure

D agno s
A Symptoms Weakn ss ea e of fatigability right upper quadrant d scomfort variable symptoms of dy pep ia hem t mesis melena abdominal sw lling d p nd nt d ma pru itus m t l depression
B Phy i al Ex min tion Asthenia weight loss pallor spider ang omata p lmar e yth ma i terus h patom galy hepatic t ndernes ascites aput m dusa ollat ral v ins h mor ho ds depend nt ed ma
C L bo t y Finding Anemia icterus d cr as d li e func t on (as mea ur d by mult ple liver function t t) (s e page 290) Unf rtunately no ingl test and often no g oup of t st s nti ely eliable
D Sp i l Diagn st P dur Liv r biopsy (punch) sophago s op r x y d mon tration f esophag al a i s

T tm t
A Speci Me ure
1 R mov l of exog nous ggr vat ng agent
a Industrial and hous hold toxins
b Al ohol and sp ces
Drugs Coal ta drugs (e g sulf nam d fast acting ba bitu at s that ar x ret d by l r) an thet agents na cot s (e g morphine sulf te)
2 R moval of endog nous ggravating factors
a Thyrotoxi osis
b urg c l conditions Biliary tra t di ease panc atic dises e int stinal obstru t on
Chroni infe tions Syphilis tuberculosis undulant f v am biasis t Spe if ally cut viral h p tit hould be tr t d dequat ly to p nt chronic h pati in l m nt (s pag 279)

B G n l M s
1 Phy i l r t This is ti l in the p sen e of t h p t c d a o of jaund e

2 Adequate nut ition

a Diet A high caloric diet (at least 2500 3000 Calories) is recommended Carbohydrates should supply the principal caloric re ds Protein should be adequate but not too high especially in patients prone to prot in in toxication Tre diet should contain sufficient fat to be palatable Patients with cirrhosis frequ ntly complain of anorexia and so it is ess ntial to make th ir di t attrac tive and palatable as well as highly nutritious Tube f ed ings may be necessary F ried o greasy foods highly sp ced foods and alcoholic be erages should be avoided

b Vitamins A and D Absorption of vitamins A and D in liver diseas is impaired du to biliary defici ncy V ta min A 5000 units and vitamin D 1000 units 1 2 times daily may be given Perles may be preferred wh n anorexia is present

c Vitamin B complex factors have been widely used but it is questionable that lipotropic or other a tions of this group of vitamins exert any striking beneficial results except in those c rcumstances where there is a def ci ncy of these vitamins (due to inadequ te food intake) It is felt that if vitamin B complex administration is indicat d it is provided by the following

(1) Dried Yeast U S P (brewer s yeast) powder 15 30 Gm daily or 20 30 0 6 Gm tabl ts daily

(2) V tamin B complex high potency prepar tions

(3) Crude liver extract 1 2 cc I M 1 2 times weekly

d Amino acid suppl ments (Protein Hydrolysate N N D) may be n o porated in o al tube or parenteral feedings as indi ated

(1) Oral 2 15 Tb p t i d (to supply 50 400 Gm daily)

(2) Tube 2 15 Tbsp t i d *Rule out varices first*

(3) I V 5% solution with 5% dextrose 1 3 liters daily

e Skimmed milk may be used f r oral o tube feedings

f Salt poor albumin 50 100 Gm daily may be employ d in seve e cases (ve y xpen ive)

g Ascitic fluid Readministrati n of as itic fluid by st rile technic (if prot in in as itic flu d is g e ter than 1%)

h Transfusions of whole blood if severe anemia and hypo prot inemia coex st

3 Ascites and ed ma may be treated by

a Low sod um diet Reduc sodium intake to less than 2 Gm NaCl daily (see p g 55) and ev n less if n c ssary Diets s erely re trict d in odium a e apt to be nutritionally in adeq at and unpalatabl but emarkable imp o eme t of ascites edema li er d sea e and portal hyp rt nsion has been report d on patients who hav been n diets ontaining 200 mg (3 gr) sodium pe day fo periods f a f w weeks to more than two ye rs Th dang r of indu ing the so called low salt syndr me with renal fail re om and death must be co s der d and wat hed fo

b Attempt to restore plasma proteins to normal lev ls (s above) This is very diffi ult to achieve

c Chlorothiazide (Diuril®) 0 5 Gm b i d q i d or ily is stated to be eff ctive in prod ing d resis in certain patients with cirrho is with ascites prod c ng a marked

incr ase in the excretion of sodium p tas ium a d hlo ide Long range effect veness s de ff cts and potential toxi ity hav not been fully valuated

d M rcurial diuretics 1 2 cc I V or I M once or twic a week (see page 204)

e Abdomin l paracente is for pain, discomfort or inability to at if neces ary

4 An mia

a Hypochromic anemia Fe rous ulfate 0 2 0 3 Gm (3 4½ gr) enteri coat d t blets t i d p c

b Hyperchromic macrocytic an mia Crud liver extract 1 2 cc I M on e or twice a week

5 H morrhagic tend n y du to hypoprothrombinemia may be treated with vitamin K preparation although this treatment is ineffectiv when intrahepat c damag is severe Blood transfusions m y be necess ry to cont ol the bleeding t nd ncy Some c ution should be obs rved in using large doses of salicylat s in these patients becaus of the enhanc d hypoprothrombin effect

a Oral M nadione U S P M naphthon B P 1 3 tablets of 1 0 mg (1/60 gr) each t i d p c If ob truc tive jaundi e is p esent give supplem ntary bile s lts (se page 286)

b I V o I M M nadion Sod um Bisulfite U S P 2 mg (1/30 gr) ry other day

6 Hem rrh ge from esophag al varic s S vere bleeding can at times be controlled by the use of the triple lum n tube Surgical m asures are u ually ha ardous and unsatisfactory but surg ry to relieve portal hyp t on may be c sidered in selected patient In young r patients in oth rwise good cond ti n in wh m hepatocellular dysfunct on is r lati ely light porta av l an tomo is m y b of b nef t

7 Miscell neous problems

a Pruritus (ee p ge 66) n usea and vomiting (se pag 251) and onstipation (p g 254)

b Corti otropin (ACTH) and th rt on Th se ag nts should be us d w th areful on id r tion of haza ds of h mor hag t ndency port l thromb is and sodium r te tion They are b st not u d in ad an d cirrhosis

ACUTE CHOLECYSTITIS (code No 687 100)

Acute inflamm t on of the gallbladder m y consi t of any one f wid variety f pathologi l ion of th gallbladd r which are dif ficult to diff r ntiat clinically Th conditions may d velop a a r ult of obstruction of th bili y pa ag s with or without stones or as a esult of inf ction Clinical finding may vary consid rably in individual ases but fo purp es of man g m nt th y may be con enie tly divid d into 3 groups a ording to sev ity mild interm di t and s v re

Di gn is

A Symptom

1 Hist ry of chroni dyspepsia o p ov d biliary calculi may or m y not be eli ited

2 Attacks of right upper quadrant colic frequently nocturnal with residual gallbladder tenderness occur
3 Nausea and vomiting are usually present during acute ep sodes

B Physical Examination
1 Jaundice may occu during or following attacks
2 Localized right uppe quadrant tenderness is c mmon
3 Fever may be present or absent

C Laboratory Findings
1 Leukocytosis is inconstant
2 Icterus index is elevated in common duct obstruct on
3 X ray findings are variable and at times difficult to inter pret A gallbladd r which fills poorly with the dye or empti s slowly may be normal D monstration of stone in the cholecystogram is the most mportant finding

Tr atment
A Mild Type (Mild or indefinit symptoms Doubtful diagnos s)
1 Bed rest M ke f equent ob ervations includ ng rep at d gentle abdominal examinations as indicated
2 Routine laboratory studies and cterus index
3 I V fluids If patient is vomiting administer 5% glucose in salin solution I V Later when tol rated add bland oral food and fluids gradually to diet as in pat ents with a ut enter tis (see p ge 274)
4 Apply local heat or cold to the abdomen
5 edative or a alg sic d ugs p r n (see below)
6 After a ute epi od has subs d d ca ry out f rth r diag nostic stud es (g GB s r es) a dicated
7 Ele t ve surgery may b on id red lat r if
a Episod s of ute ch l y tit s a e definite se ere or e u r nt
b Cholelithi sis esp c ally f cond tion is symptomatic (or if asymptomatic and pat ent is l ss than 45 years of age)
c S condary d sease exists in elated struct res (e g liver pan r as)

B Intermed t Type (Symptoms a moderate and definite and the patient s g neral o dition s good b t the sub equent clin ical course is unpr d ctable)
1 Bed est i ho pital Follow pati nt by a eful fr qu nt observ t ons and o ding of tal sign and repeated gentle bdominal e am nations a indi at d
2 Pe f rm WBC and diffe e ti l count v 12 hours and icterus ndex o serum bili ubin d ily (if jaundice is us pected or present) Blood l ct olyt s N P N a d serum amylase studies may be indi t d
3 Plain x rays of the abdom n are of valu f the pati nt s phys cal cond tion p rm ts it Postpon hole ystograms until acute phase has passed
4 Nasal duodenal suction should b employed fo abdomin l distention and vomiting p n
5 Fluid a d le trolyte balance to be maintai d by par nteral fluids as indicated
6 Sedation Phenobarbital sodium (phe obarbiton sodium) 0 065 0 13 Gm (1 2 gr) or pentoba bital sodi m (pe to

ba bitone sodium) 0 1 0 3 Gm (1½ 5 g) I M or by rectal suppository

7 Analgesia U e the following gly or in combin t n
   a Cod in Phosphate U S P 30 65 mg (½ 1 g) q 4 hours p r n
   b Morph ne Sulfate U S P 10 16 mg (⅙ ¼ gr) q 4 hours p r n se re pain only
   c At opine Sulfate U S P 0 4 0 6 mg ($^1/_{150}$ $^1/_{100}$ gr) q 4 hours p r n fo severe pain only
   d Gly eryl Trinitr te U S P (nitroglycerine) 0 3 0 6 mg ($^1/_{200}$ $^1/_{100}$ g) und r tongue p r n
   Papav ine 65 mg (1 g) q 4 hours p r n

8 Ea ly su g ry When clini al and laborato y ev dence point to *progression* du ing th first day of observat on or if th y show *no evidence of improvement* aft r the f rst 2 days operative intervent on is usually indicated (cholecys tostomy)

9 Electiv surgery When there is clinical and lab ratory evidence of mprovement du ing the first day of ob r ation th pati nt should be managed conservatively until symptoms have subs ded
   a P rform necessary x ray and l boratory studi to con f rm d agnos s and t valu te th pati nt s physiol gi al status
      (1) Icterus index Surgi al r k s less when th s i falling than wi n t i sing
      (2) Ch le ystog am Pr ferably aft r jaundic clears
      (3) Li r fun tion t ts (e page 290) pl ma prothrom bin rum proteins and s rum lectrolytes may p o id v lu ble nformat on
   b Pr pa e fo subsequent elective su g ry by high CHO d quate prote n l w fat diet with upplem tary vita min plasma r whol blood t ansfusi ns p n and Menad one Sod um Bisulf t U S P (v tamin K) 2 mg ($^1/_{30}$ gr) I V ev y oth r day if j undic is pres nt r prothr mbin i low
   Poo surgi l risk pati nts in l d g ard ov s ula diab t c and essiv ly ob se p ti nt hould be per ated upon only ft a ful nd vidual e lu t on
   d Fi t e urg y Ch l yst ctomy should be perfo med only ft r th pati nt ha be n ad qu t ly pr par d for op at on Common d ct explo ation s ca ried out at the tim of cholecy t tomy

C S C In c s of empyema gangr ne perfor tion and bil p r t nitis p ompt chole y to tomy is u ually the treatm nt of hoi e Aft r hol ystost my when the pati nt s a ut cond t on has sub id d p form ch langiog phy to det min p s nce of st n and pat n y of common duct If the pati nt is a go d surgi al isk p epa ad qu t ly fo le tiv ope t on (as above)

CHRONIC CHOLECYSTITIS (code No 587 100 0) CHOLELITHIASIS (Gallbladder) (code No 587-615)

As with acute chol cystitis chronic inflammations of the gall bladder may be grouped together clinically irrespective of the wide variety of pathologic lesions The disease usually follows repeated attacks of acute cholecystitis or may be due to chronic biliary stasis biliary ston s or infection Many patients who exhibit symptoms of so called chronic gallbladder disease are actually suffering from functional GI disturbances e g nervous dyspepsia (see page 260) The management of cholecystitis without stones is usually a medi al problem When associated with stones the cond t on often requires surgery The question of surgery for asymptomatic cholelithias s (silent gallstones) remains extremely contro ersial and the d cision to operate must be individualized for each patient

Diagnosis

A History Recurrent episodes of shifting upper abdominal dis tress largely in the right upper quadrant occasionall epi sodes of acute colic abdominal diste tion nausea and vomiting and intolerance of fatty and gas formi g foods

B Labo atory Examination

1 Gallbladder dye demonstration of poorly functioning gall bladder (poor filling and emptying on repeated examination) and/or biliary calculi

2 Duodenal drainage may demonstrate excessive quantities of exfoliated epithelium mucus bacteria a d pus in dark fraction of bile

Treatm nt

A M d cal Management

1 Ind cat ons

a Patients w thout clini al or x ray evidence of ston s who respond to careful m di al treatment

b Questionable diagnosis or low g ad symptoms Differ entiate from functional dy pepsia (a difficult problem)

c Patients who ref se surgic l treatment

d Po r operative risk patients

e Pati nts w th a short life exp ctan y from other cause

2 Treatment

a D et In general 2 differ nt types of diet

(1) Low fat d et (classical typ) This diet exclud s both cooked and uncook d fats from all sources (see page 54)

(2) No greas di t (modern concept) This diet ex ludes only th cooked fats (grea e) which ar non emulsified at body temperature but includ s the un cooked fats such as re emulsified at body t mperature The first phase of this diet is simila to th *Sippy 1 diet* with frequent f edings of milk and cream as improve m nt occurs the diet incorporates egg butter cooked vegetables and fruit and cere l as t lerated

b *Antispasmodic* medication Ve y useful

(1) Tincture of belladonna *10 drops t i d a c*

( ) Belladonna xtract 15 mg (1/4 gr) t i d a c

(3) Phenobarbital antisp asmodic mixtures (ee p ge 268)

(4) Atropine s lf te 0 4 0 6 mg (1/150 1/100 gr) o lly s blingually o subcutaneously

c Bile a id prepar tions Not to be used in patients with biliary tasis du to complete mechani al obstruction A cholag gue stim l tes evacuation of the gallbladd r a choler tic alters s c etion of the bil on tituents a hydrocholeretic alt s volume of bil
 (1) D hydro holic Acid U S P (Decholin®) 0 25 Gm (3 3/4 gr) t i d p c holeretic (?) hydrocholeretic
 (2) Ox Bile Ext act Caps l s N F 0 3 Gm (5 gr) or t bl ts 0 2 Gm (3 gr) t i d p c cholagogu chol etic nd hydrochol r ti

d Sedation Phen barbital antisp smod mixtures (s pag 266) and barbit rates (see p ge 39)

e Antacids These drugs freq ently provide empi ic relief of many of the annoying symptoms of g llbladder dyspepsia Thei mode of a tion is not l ar but they are felt to eliev a soci t d hyperacidity and to hav oothing effect on the d od num and sphin ter (se p g 264)

f Laxative dr g (catha tic)
 (1) Sod um Pho ph te N F (d sod m pho phate) 4 8 Gm (1 2 dr l 2 tsp) dissolved in warm water before b akfast
 (2) M g esi m Sulfat U S P (Ep om salts) D tast ful 4 8 Gm (1 2 dr or l 2 t p) d s lved in warm w ter b f e br kf t This may be used i itially but ts p olo g d use is i advisable

g Local heat to bdom Hot w ter bottl o electric pad p r n fo mild dis omfort

B S gic l Man g ment

1 I d c t s (p viding th patient i a good surgi l risk)
 a P tient with t linical or x y vid n e of sto who fail t respond to intensiv m dical treatment Surgical r ults howev also questio bl
 b Pati nts with biliary stones w th o without jaundi e who h ve r ent att ks of ight pp abdomin l quadrant pain A ympt mati h l lithi i in p ti t le s than 45 yea s of g i id ed by om to b an indi ti f su g y
 P ti nt with su picion of gallbladd r malignan y

2 Choi f ope ation is cont ov r i l In gen al holecys te t my is pref d to th p lli ti p oced r except when the surgi al risk is poor the patient i tously ill ther a t hnic l ont indi tio s

DISEASES OF THE PANCREAS

ACUTE PANCREATITIS (code No 690 930)

A ute pan t tis is ha acte iz d by a sudd n onset f seve goni ing on tant o r mitt nt p in oft n extending t th mid b k shoulder flanks Sympt ms of vasomoto collaps (hock) m y be pre t P ralyti ileus o obstipation and v miting oft n ur A p st hist y of dy pep ia ul er r g llbladd r diseas

may be eli ted Physical examinat on reveals epigastric tend r ness and rig d ty Th re is usually abdominal distention There is an elevation of serum amylase and lipase l vels (may be transitory) Leuko yt sis is common and glycosuria may occ r

Treatment

A Emergen y M asures for Impending *Shock* (Vasom tor Col lapse (ee pag 27)
   1 Bed rest in shock po it on (se page 3)
   2 Morphine ulf te U S P 15 20 mg ($1/4$ $1/3$ gr) subcut or f n essary I V may be mployed for the r lief of pain Perhaps mep ridine (D m rol®) 100 150 mg might b of value a a substitute for morph ne sulfate b ca se of its all g d antispasmod c actio
   3 Atropine Sulf t U S P 0 4 0 6 mg ($1/150$ $1/100$ gr) sub ut should be give i a an ant spasm d c
   4 Gly ryl Tr n tr t U S P (n troglyce ne) 0 3 0 6 mg ($1/200$ $1/100$ gr) sublingually may l employed for r l f f sev pain
   5 P rent al fluids
      a Plasma Give 250 500 c of pla ma I V immediately and follow with ubseq nt infus on of pl sma su l s a e *necessary to corre t d st b d flu d b lan*
      b Crystalloids 5% glu se and/or n rm l sal ne may be used in tially in l u of plasma (when the latt r is not v il able) o to corre t alte ed fluid and mineral imbalance
   6 Withhold food and fluid by mouth
   7 Empl y continuous ga tr suct on
   8 Careful obs rvat on The pat ent should b constantly at t nded and tal sign sho ld b heck d at 1 30 min te int rval a ind cated during th acut pe od Blood ount hemat cr t serum amyl se and l pase hould be che ked

B Follow up Aft r the pati nt h s recov ed from shock or if p t nt h s not d veloj d sho k 2 alter ati es should be c n s dered w th regard t fu the immediat management
   1 Co servative or exp tant m d al man gem nt Th s i to b p ef rr d when v r po bl Th patie t should b ob s rved closely for evid nce of o tinu d nflam m tion of the *pancreas ar d/ relat d stru tur s Th opinion of a s rg* al consultant hould be obt in d in ev y ca of s spe t d acut panc eatit s
   Im nediate surg al interv nt on Wh n th diagno a is in doubt and th re s a possibil ty of a ous and surgically correctibl l sion (e g p rforat d p pti l er) n explor atory pe at on may be ind at d
   3 Obse vation The our of the nflammatory pr ce s should b b erved by f equent rep ted physi al e amin tions and blood counts and by bl od suga l v is and serum and urine enzym determinat o s a ind cat d
   4 Support v the apy
      a No fluid or foods should be g v n by mo th fo t l t 48 h urs and continuou gast ic su tion sho ld be main tained for that pe iod
      b After 48 72 ho rs sm ll quant t es of bland low f t l qu d foods may be int od ed gr d lly by mo th g t l r ated Gastric suction may be tempo ar ontinu d

seve al times during the day f r small o al feedings and then g d ally d scontinued depending upon lin al p g ress

c Fluid and lectrolyte balance is maintained by app op te p ente al fluid (pag 7)

d At opin s lfat 0 4 0 6 mg (1/150 1/100 gr) s bcut may be dminist d t i d in an att mpt t upp ess pancreatic se tion

C C v les t C e Wh l n l d e of pan r atic in flammation h clear d

1 Bland l w f t diet should b g v n

2 Dr g

a B ll donna xt a t 15 mg (1/4 g) t i d or atropin sulf te 0 4 0 6 mg (1/150 1/100 g) t i d

b Ant id may b of al (ee page 264)

3 E luat f pat ent fo urg y C nsider th pat nt c fully f r el t e surg l t tm nt f bili y tract diseas t h lp pr t r curr n f att k Sphi cterotomy m y be ind ated in ur ent pa at t o f ecurre t o p ist t p m d to d te tio

P ophylax s

A All as i ted t logi al factor should b o ted e g bil y tr t d sease du d n l ul etc

B D t P ti nts who ha e had prev o s m ld tt ks of ut pa eat t hould b pl d n low f t di tary egime and p m tt d no l h l thi may r duce the poss bil ty f sub equ nt att k

CHRONIC PANCREATITIS (code No 690 956)

Chro inflamm t y d a f the pan s o iat d w th f b is f th gland In the int lobular type the ext n l e t ns a e often d f i nt and d g t v di tu ban f equ nt In the int acin typ th i l t t volv d and diab t s d v lop A ut pan e tit s m lignant di pan at c al uli p n t ating pepti l rs h patob l a y dise and gen li ed te ler a th m omm c us t v f t Th may be a h t y of u r t p s d s of p g t i pain and t n de s flat l n and bow l i gul t Th phys l x mi tion eal o ly an egul o int mitt nt ict u

L bo at y find g m y in lud bulky foul f tty stool n t ing und g t d food gly uri d ea of pan eati n ym and duod al d ain g Pan ati al if c t n m y be s n on y

T tm t

A Sp if M N n

B G l M R mo agg at g f cto s wh p ibl h p t b l y d g trod od l dis as (g p t at g p pti l) and al hol

2 Nut iti

D t High CHO low fat low p ot in h gh l ium

d t When pan eati a hyli is the c nspicuou f tu of th illn ss p ot in hyd olys tes m y b mpl yed t

RELATIVE VALUE OF VARIOUS LIVER FUNCTION TESTS IN JAUNDICE AND LIVER DISEASE

Physi l gi l B sis f T t	TEST		A C U T E H E P A T I C D I S E A S E					Lat t o Sub lini l H p tic Di	Chronic H p tic Dise	N m l Rang f V l es
			Pr i te ic Ph	I t ri Ph			Con l c t Ph			
				Ob t ti	Int h p tic	H m lyti				
B l P gm t M taboll m	U in Bill bi	P	A ( )	B	B		B (d)			N
		Ab				A				
	U i U obilin g	In	A (in)		A	A	B (d)	B	B	1 4 mg /24 H
		Ab		B						
	F U obilin g n	I				A	B (d)			50 250 mg./24 H
		Ab		A			B (in r)			
	S um Bilirubin (I t l d)		A (incr)				A (d)	B	B	0 05 0 50 mg % 3 8 11 U lts
En ym A tivity	S m Alkal Phosphat			A ( )						2 4 5 U ll (Boda ky)
	S m T am (SGOT)			A	A		±	±	B	80 40 U t
Ch l t ol M taboli m	Plasm Ch l t l	E t ifi d			B (d)					60 75% l T t l
		T t l		B (in)						100 250 mg %*
P ot in Synthe is	Pl m P oth ombin	B f Vt K								90 100%
		Aft Vit K		A (p)	A ( )				B ( )	15% i , l 48 H.
	S rum P ot ins	Alb min						B	B	3 4 6 5 Gm %
		Gl b l						B	B	2 0 3 5 Gm %
		Tot l							B	5 7 8 2 Gm. %
	S um Thym l T b d ty						B	B	A	0 4 U t
	C phalin Floc l i		B		B			B	A	0 1 pl
e E tion	B m ulal in (5 mg /Kg)						B	A	A	5% (30 minut) 0% (45 min t)

Lett ind t l ti di gn ti l f th arious t t in ch of th lini al pha s m tion d in the t bl
A E ll t B Good ( ) Limit d o al

Var wid ly w th v l l b S i l d t mina ion impo tant
(No pon)
With j undi l > 20 ignifi ant
Without j undi val > 10 ignifi ant

supplement n tural proteins If diab t i pres nt di tary mod f c t o may b necessary (s e p ge 57)

b Vitamins M ltivitamin tabl ts and B complex vit min hould be giv

c C l um salts Cal ium glucon te 1 Gm (15 gr) tabl t 2 3 t blets t i d may be giv n to help r place calcium lo t in stool

d Replac ment of d fic t pa cre t c en ym s P creat n t iple st ngth 0 32 Gm (5 gr) q valent to 15 g P creat N F teric c ted 1 3 or more tabl t t i d p c p r n

e D terg nt agent (g so b tan mo ool t) are of do btful value in co cting impaired fat and alcium abso pt

3 Drugs

Ox B l Extr t N F (bile s lts) 0 5 Gm (7½ gr) t d p m y be of val e

b Dil ted Hydr chlo i Acid N F B P 1 0 4 0 (16 64 min) t d with me ls

c Ferr S lf te U S P 0 2 0 3 Gm (3 4½ g) t i d p fo anem a

d Ins lin fo d abetes wh pres t (see p ge 395)

PANCREATIC CARCINOMA (code No 690 8)

C in m of the panc eas o curs m t commonly in m l s o 50 y of ag It is chara t rized by epig t i pain xt nd ing to the ba k rap d and m ked w ight loss a d multiple gastro int stin l c mplaints Physic l xamination may eveal an p g t ic m l t rus and h patic nl gem nt Labor tory findings in lude viden of disturban es of arbohyd at m t b l sm le vat o of s rum lipase and amyla e and w dening of duoden l loop rev e S configur tion of du de um on x y

T atm t

A Non p ativ Me sur s Symptomati and p lli ti e

B S g c l M asur s

1 Rad l s g al ex ision in lect d as

2 Palliative u gi l p ations Biliary tract shunting p ed r in indi t d ases associ t d with j undice

Chapter 11

DISEASES OF THE URINARY SYSTEM

NONSPECIFIC URINARY SYMPTOMS

Urinary symptoms should n ver b ignored Symptomatic treat ment n ust never be substitut d for a thorough investigation of the underlying organic or functional abnorm lity

FREQUENCY OF URINATION
(code No 706) (Nocturnal code No 707)

Frequency is one of the most common of the urinary symptoms and may occur either during th day or night It may be caus d by any of a variety of o ganic or funct onal disorders and s often of psychogen c origin

If the symptom is disturbing to the p tient tre tm nt can be instituted wh le di gnost procedures re being ompleted Us antispasmodic sedative drugs as for dysuria (see below) Fluid restriction may b employ d particularly at n ght if there are no cont aindicatio s

DYSURIA (code No 704)

Dysuria may be aused by infe tion of the g nitourin ry syst m or by l sions of th lower urinary tr ct It s usually associat d with urg ncy and freq ency Mild dis omf rt may also be produced by a highly oncentrated acid urin

Treatm nt
- A Specific Measures Treat th unde lying di s
- B Symptomat c Me su Antisp smodic and sed tive drugs
  1 Atropine Sulfate U S P B P 0 4 0 6 mg (1/150 1/100 gr) e ry 3 4 hou s or othe pa asympatholytic dr gs (see page 34)
  2 Phenob rbital U S P Phenobarbiton B P 15 30 mg (1/4 1/2 gr) t i d q i d or more as ne d d
  3 Bladder sedativ mixtur

℞ Potassium citrat	30 0	℥i
Hyoscyamus tincture	30 0	i
Elixir of phenobarbital q s ad	120 0	℥iv

Sig 4 cc (1 dr) t i d a c and h s or q 4 H

OLIGURIA (code No 702) and ANURIA (code No 703)
(also see Lower Nephron Nephrosis page 303)

Ol gur a and anur a u u lly se ious symptom nd may b du to many ses sh ck ong st ve f ilu e dehyd ation renal fa lu or oth l ss common d o d It is impo tant to d ffer nt at these sympt m f om urinary r t t on

T tm nt
A Specif M s T t und lying d se se
B Fl id D *not give xcess fluids to patients with oliguria or anuria due to r nal failure death will result from overhydration* Simpl d hyd at on due to in adequat fl id intak in d lo s (caus d by ve p pirat n diar h a) s asily o rected by al or p e t l flu d Replace any l t olyt l (e pag 15)

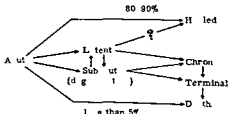
RETENTION OF URINE (code No 705)

U in y t tion du to b tru ti n may b the ute o h ic and most mm nly d t nl g ment of th pr tat The bl dder m y b percus d and palp ted above th ymphys
Pl c p tient n w m tub of w t unl th s p oc du ont aind at d by oth xi ting d e se If th s un u f l annot b empl y d th p t nt should b th t i ed Corr t n of underlying bno mal ty n y to p v t a e

SPECIFIC DISEASES OF THE KIDNEY

GLOMERULONEPHRITIS

Glom l ephrit s s appar ntly diff v ul di e p im ily involving both k dn y Th d a is beli v d by s m to b a d lay d ll gi p n t b t i l infection (us lly b t h m lyt t pt o l inf tion) Th b cut and hr ni fo m f the di ase r p nt p g ess o of th unh led acute r l le i
Th ou f th d s as an b t b tlin d by th f llowi g hart



It is difficult in the initial attack to predict the course of the disease However about 80% of the patients have m ld damage which allows for healing Most of the other 20% enter the so called latent phase and the nature of the p ogression of the diseas se ms to depend primarily upon the extent of the renal lesion The greater the amount of initial damage th more rapid the progres sion to subacute terminal stages and death By proper treatment it may be possible to retard this process

Diagnosis

Diagnosis of glomerulonephritis rests prima ily upon the uri nary findings of red blood cells and/or red blood cell casts there fore a careful examination of a freshly void d urine specimen is the best single examination in making the diagnos s

General Prin ples of Tr tment

The problems of therapy in renal disease are threefold Tr at ment of each aspe t of the disease will be discussed in terms of th se principles

A Addis s P incipl of Rest The cause of the progression of th renal l sion in gl merulonephritis is u known Addi suggested that progression i due to too great a work load for the amo nt of functioning renal tissue remaining Most f the work of the kidney was assumed to be involved in the co ce tration f solutes (e the r absorpt on of w ter against osmot c p essure) U ea is the m st important solut He it was suggested that the l ss urea (from protein cataboli m) and m re w ter the less work

However it ha recently been shown th t the perce tage of en rgy utilized by the kidn y (O_2 onsumed) in the con entration of solutes s such a small fraction of the total as to make this thesis untenable

On the other hand the emp rical evidenc of Addis s prin ciples has not yet been r f ted The fore an adequat but minimal prote n intake remains importa t in influencing the course of the d sease

B Correct on f Phy iologi al Alt ation Since many f th manifest t o s of renal dise s aus or are associat d with marked physiological alt ations (e g hypoalbuminemia in the nephrotic syndrom) th apy s aim d at r e ting these phy iologi al disturbanc s as they occur Howev r many of the defects apparently co re ted qui kly revert to the d ease st t as soon as therapy is stopped (e g eturn of hypo lb min emia after I V albumin is stopp d) This may mak ontin ed intens ve th rapy imp ative if one wish s to prolong life especially in terminal cas s Howeve d not use ther peutic means which appear to correct the phy ologi al defect but which are in themsel es unphysiol gical or tend to defeat Principle A bove (e g high protein d et to o re t hypoprot in mi)

C Complicati ns Complic tions are t eated a they ri e and ar d scussed in the app opri te section

Diagnosis

The history usu lly re eals an onset of hematuri puffin ss about the eyes head che and occasionally m laise and f ver occu ring 7 10 d ys after an infection (usually sor throat) The urine usually has a low specifi gravity ex ept when oliguria is p esent in which case it may be elevated Th urin sediment is loaded with red cells and white cell (tubular cells) but has only a few asts Red cell ca ts are pathognomonic Mild to moderate proteinuria is present There may be increased blood volum and app ent or r al an mia Th serum blood ur a nitrogen and cre atinine may be elevated Hypertension is usually present

T eatment

A Specific Measur s There is no specific treatment Treatment f acute neph iti with corticotropin (ACTH) or the co tison s has been generally quite unsatisf ctory A few cases respond well but these are ex eptions Gr at care must be exe cis d in the use of ticotropin (ACTH) or the co tisones in this dis ease f overdos ge an l ad to incr ased edema and pre ipi tate acute ca dia failur Sodium r striction should b rigidly obser ed (s e page 55)

B Ge eral M su e Ther is little that an b done to alte the abnormal physiology i e in eased blood volum el vated N P N etc These tend t disapp r spontaneou ly as the condition improves

1 Home c r r hospitalization The av rage case of acute nephritis can be cared for in the home although h spitaliz tion become ne ess ry if complications deve op

2 Bed rest The patient should r main in b d but may have bathroom privileges The d tion of th period f b d rest i difficult to anti ipat b t it ppe rs th t arly ctivity leads to som xa rbation of the al lesion A good g neral rule is to k ep the patient in b d until the sedim nta tion rat i n rmal until the blood p ssure and blood N P N have be n n rmal fo ab ut 2 week or until the u inary find ings show not more th n 0 2 Gm protein/24 hour Do not w it f r ed ell to d appear from urine for they m y remain for lif If pati nt is enter ing the l t nt st ge Return to a tivity should be g adual

Diet

a I iti lly a light d et with prot in r strict on is indi ted Giv 0 2 0 3 Gm protein/Kg (0 1 0 15 Gm /lb) body weight f fir t 7 10 d y Th n inc e se t 0 5 Gm /Kg (0 23 Gm /lb) body weight plu the amount of prot in lost in i e

b Fluids and par nte al f eding (S e p g s 7 26 fo ompl t dis u sion)

(1) Do ot force fl ids but all w fluids ad lib Adjust fluid intake to hanging physiologi al st te (e g if liguri develops fluid r striction may be n ces ary to av id drowning the p ti nt) In th cute phase di esis annot alw ys be indu ed by for ing fl ids

(2) I V fluid are rarely indicated except in c s s

associated with dehydration or abnormal fluid losses In these cases it is important to give parenteral serum albumin 0 2 Gm /Kg (0 1 Gm /lb) of body weight and sufficient glucose to maintain as close to an isocaloric intake as possible Give I V fluids slowly

4 Blood If anemia is m rk d a carefully cross matched blood transfusion may be administered slowly

C Treatment of Complications

1 Cerebral edema with resultant headache and convulsions
   a If headaches are not severe and convulsions are not present give sedation with pentobarbital 15 60 mg (1/4 1 gr) or paraldehyde 4 8 cc (1 2 dr) b i d to q i d as necessary
   b If headaches are severe and convulsions are present give magnesium sulfate 1 0 Gm (15 gr) (10 cc of 10% solution) I V slowly *CAUTION Whenever administering magnesium sulfate I V always have syringe filled with 10 cc of 10% solution of calcium gluconate or other calcium salt ready to administer I V if narcosis develops or respiration ceases*

2 Cardiac failure One of the most common causes of death in acute nephritis is acute cardiac failure At the first sign of failure digitalization should be instituted by one of the rapid methods (see page 197) Sodium restriction should also be instituted immediately

3 Focal infections Any focal infection especially of an acute nature should be treated promptly Chemotherapeutic agents and antibiotics may be used as necessary for this purpose but they are of no value in the therapy of the nephritis itself Effective blood levels of sulfonamides and penicillin may be maintained with smaller dosages than under ordinary clinical circumstances this is due to the decreased tubular excretion (especially of penicillin) or the decreased glomerular filtration (as with sulfonamides)

SUBACUTE GLOMERULONEPHRITIS (code No 712 100 0)
(Nephrotic Syndrome code No 713 x40 or Degenerative Nephritis)

Diagnosis

A history of previous acute nephritis may not be elicited The question of whether all cases of the nephrotic syndrome are preceded by acute nephritis has not been settled but it appears that they are not The most common physical finding is marked pitting edema Proteinuria is marked the urinary sediment may contain many casts (especially fatty casts) and many epithelial cells but few red cells Blood N P N d c at 1 lly o m l b t the serum albumin is low and there is a marked lipemia Anemia may also be found Azotemia is also present in some cases

Treatment

A Specific Measures Corticotropin (ACTH) and the cortisone have been employed in the treatment of subacute nephritis with

x llent r s lts The use of these hormone results in a marked decres e or entir d appearance of the albumin ia with a sub equent or concomitant d u esis and a gradual eturn of s rum albumin to norm l level Th dos ge and duration of administr tion are quite va iabl There are two main points of view

1 I termittent th apy Th drugs a e given in ho t ourses of 7 14 days and r p ted a ne essary Ov r 50% f p ti nts o treated h v rel psed promptly (s e page 423 f r do age)
2 Cont u us therapy Th advocates of co t otropin (ACTH) and dre l st o d ther py point out th t this is a ch o c disea e and that th e is no vid ce that thes dr gs in any way infl enc ts ultimate ou se Th drugs a e giv n c n tinuously in the lowest dosag pos ibl t keep th d se se und r c nt ol (e g urine f ee of prot in)

All p e a tion for admi i t ation f o t otrop n (ACTH) and the c t ones ho ld b ob er d

B G n al Me u s

1 Re t Th p in iple I rest for the kidneys is contin ed in thi st ge (se p g 294) Th s stage may repr sent pro gres on of th nal I sion and I ds into the t rm nal stage The t ans tion may be r pid r th e m y be re u ren e of d ma o r a p riod of many ye rs
2 Diet B c us of the m ss e albumin ria an att mpt m d to k p the b dy in n t og n bal n but at the s me time ot to rload the k dney *There is no evidence that the hypoproteinemia can be corrected by a high protein diet per se During l ng-term administra tion of c rticotropin (ACTH) r the cortisones gre t care sh uld be taken that the protein intake is adequate at least 1 Gm /Kg (0 5 Gm /lb)/day*
   a Ad lts 0 5 Gm p ot in/Kg (0 23 Gm /lb) body weight p r 24 hou s plu an amount f p ot in p r 24 h urs th t is qual to th t l st in th in (Exampl 70 Kg m n w th p ot inuri f 10 Gm /day 0 5 Gm /Kg body weight 35 Gm p ot in 10 Gm lost in rin 10 Gm prot in T t l 45 Gm f p tein p r d y a th pp oximat in tak)
   b Ad l s nt 0 75 Gm p ot in/Kg (0 35 Gm /lb) body w ight p r 24 hou s pl urine lo s
3 T tment f ed m Th p im um of the py f om phys l gi l p int of vi w th tt mpted r m v l f ed m For this th r e al ds a ilabl

   Sodium t t on Th prob bly th method f h i e lth ugh ot lw y ff ti when u d alone Th sodi m e tr t d t b low 1 0 Gm (15 gr) per d y t t m str tion to 0 5 Gm (7½ gr) p d y m y b n s y This r st cti n should not b ca ried t long than i cl ni lly ne s ry and wh n the re t ict on is mark d th pati nt should be wat hed f r ymp t m f odium d fi i n y *Salt substitutes s uld n t be empl yed Educ te pati nt to live on low s lt int ke L ng term use of exchan resins h s pr ved un ati factory they are unpal t ble d te d t produc id sis*

b Mechanical removal Whenever the fluid accumulation becomes very marked mechanical removal is one of the *most* beneficial methods This includes removal from pleural and per toneal cavity and especially the use of Southey's tubes to remove massi e edema from the legs Any infection resulting from use of Southey s tubes should be controlled with antib otic agents

c Agents to increase osmotic pressure of blood

(1) Salt poor human albumin Of all the measures th t have been employ d to increase osmotic pressure this ag nt has the soundest physiological justification 50 Gm (1 2/3 oz) per day I V may induce a rapid diuresis However the effect is transient mo t of the albumin is lost in the urine and much of the re mainder is rapidly catabolized Aft r cessation of the therapy (may be continued for from several days or weeks) there is little evidence that the course of the disease has been modified and in most cases the serum albumin conc ntration will return to its former low l vel

(2) Blood plasma Plasm has little value primarily be cause of its high salt cont nt It may also carry the vi rus of inf ctious hepatitis

(3) Some of the newer plasm expanders (Dextran® Gelatin Plazmoid® etc) ha e been employ d Although they may induce a temporary d u es s thei rout ne *use is* not indicated

(4) Other prepar tions such as acacia and isinglass are mentioned merely to b condemned Their use is entirely unphys ological

4 Chlorothiazide (Diu il®) in do e of 0 25 1 Gm (4 15 gr) daily appears to be a pr m sing di r tic ag nt in this co dit on

5 Ac d alts (i ammon m chloride) These drugs may be used but their eff ct is often not not d unt l mild acidosis develops Sinc these p tients may readily develop acidosis caution should be e erci ed in u e of these drugs

6 Mercurial diuretic are not advised They may cause at least temporary renal damage and g nerally re not bene ficial

7 Water Patient should be encour ged to drink adequate fluids As long as there is sodium restriction water will not accumulate in the tissu s Forcing fluids however is of little value in indu ing a gr ater diuresis if fluid intake and urinary output ar adequate

8 Induction of infection It has lo g been known that pat ents with the nephrotic syndrome develop r missions following some virus infections especially measl s In susceptible children with subacute nephritis exposure to one of the mild exanthematous dis ases may be indicated

C Treatment of Compli ations Th principal complications are infections commonly pneumonia and pneumococcal peritonitis These should be treated with the appropri t chemothe apeutic and *antibiotic drugs*

LATENT GLOMERULONEPHRITIS (code No 712 190)

The patient with lat nt n phritis m y or may not give a history of an attack of acute glomerulonephritis In the latent phase al though ther are no complaints or physi al findings the lesions ither have not healed at all or there is insufficient h aled ti sue to carry the entire load of wo k *The latent phase may last for as long as 20 to 30 years* and th patient may die of other inte curr nt disease before his ren l function fails

Diagnosis

The only positive finding are oc asional red blood cells r d c ll casts and transi nt to persistent albuminuria The physical examination and all blood finding (hematologi al and chemical) ar normal

Tr tm nt

A Ge al M sures

1 Diet The patient should be on a minimal but ad quate di t containing 0 5 0 75 Gm protein/Kg (0 25 0 35 Gm /lb) body weight At least 50% of the p otein should consist of dairy products vegetabl and c r ls
2 Fluids The p tient should be t ught to fo ce fluids 3 000 4 000 c (3 4 qt) per day
3 Activity The patient should be caution d against trenuous xerci but hould b en ourag d to liv as normal a life as possibl
4 Physi logical nside ation Sin there is no appar nt phy iologi l abnormality no pecific t tment i indicat d

B Complication Ps udo-exac rb tion of ymptom Pati nt with lat nt nephritis have a cha cter stic nonsp ifi respons to any febrile illn this is particularly ma ked in th se of for ign p otein re ctions (g va ination inoculation, or inf ctions) Thi reaction is char cteriz d by hem turia (oft n gross) and a mild inc e in p oteinuri and wh te blood cell coming on immediat ly with the fever and subsiding with th f ver *This is not another attack of acute nephritis* There is no d lay betw infection and r nal re ction no hypert si n no edema and no an mia

It is x edingly rare t ha a econd atta k of true acute glom rulon phritis M t cas of so- all d econd attacks are eally xacerbations of lat t neph tis Th e erba tion neve damag the kidn y s verely as th initial atta k and one can rar ly d tect any hange in enal t tus aft r th att ck is over

1 Prophylaxis B us of th associ tion of exac bation with fever inf ction and va cinati n, one hould avoid these insult whenev pos ible Pati nts with lat t n phriti hould not und rgo vac ination routin ly
2 Treatment The i no treatment of th renal les on othe than ontinu d t eatment of th lat nt nephritis T eatme t i im d entir ly at the p ecipitating caus Th patient hould b kept in bed fo about 1 we k after fev r has disap p ared and should be allow d up slowly ov the next w ek

CHRONIC OR TERMINAL GLOMERULONEPHRITIS
(code No 712 100 0)

It is difficult to say when the terminal or chronic stag begins It is the time at which signs and symptoms of renal insufficiency develop It may be very difficult to dete t early but as it develops certain findings app ar Most characteristic are the (1) elevation of blood N P N (2) development of an mia (3) gradual elevation of blood pressure and (4) presence of a few casts and red blood cells in the urine However the blood protein is normal edem is ab sent early and there is slight prot inuria Thi stage may l st from several months to a f w years

Diagnos s

A h story of acute or subacute nephrit s may be elicit d The physical findings vary with the severity of the disease but hyper tension with its asso ated vascular changes is the most co nmon finding Ed ma usually appears and may be due to cardia or renal failure The urine has a low or fixed spec fic grav ty There is a mild to moderate prot inuria The sediment cont ins a few red *cells* and broad c *sts* (*renal failure casts*) and a *few epithelial* cells As anemia develops incr ased blood urea nit ogen altera tions in electrolyte balan e and a decreas in serum prot ins occur

General Tr tment

A Di t A the blood N P N and c eatinine begin to rise any *in* r ase in protein ntake is f llow d by a marked rise in N P N The pat ent s protein intake must be restricted to 0 5 Gm /Kg (0 23 Gm /lb) body we ght plus the urina y losses

B Fluids are forced to 3 000 4 000 c (3 4 qt) per day

C Tr atment of Physiological Abnormalities As th N P N con tinue to rise and renal fail r be omes more s ere th re is a progressive t ndency to acidosis and alte ed electrolyte b l an e The k dneys become un ble t form ammonia or con erv fixed base and f x d bas elements on equ ntly begin to d rease in th blood

1 E rly in the terminal phase th se are r pla ed by oral use *of salts* E ther of the following mav be us d
   a Cal um lactate or chloride 3 5 Gm (45 75 gr) da ly
   b A mixtur of the follow ng salts
      ℞ Sodium itr t 100 0 3xxv
      Calcium chlorid 3 0 g vi
      S g 2 Gm (30 gr or 1/2 tsp) in 1 glas water t i d
2 Alkalin z ng urine The u ine should be maintained at a pH greater than 6 0 with sod um itrat or sodium bic rbon te 1 2 Gm (15 30 gr) *q i d This i do e to h lp prev nt* cast formation in th collecting tubule
3 Hosp tal treatment As uremi becomes more marked and acidosis more profound nausea and vomiting d elop it is generally n cessary to place th patie t in the hospital in o der that the electrolyte balance m y be adjust d as n ded with I V flu ds (ee page 19) Ur mia mu t also be treated (ee next page)

HEALED GLOMERULONEPHRITIS

Any pati nt who has had an attack of acute glomerulonephritis has undoubtedly suffered p rmanent destruction of some of the nephrons The lesion is said to be healed when ther is no longer any evidence of activity and the number of remaining functioning nephrons is great enough so that no impairment in function or structure can be found However there is no way of estimating how many nephrons this may be It is always possible that the number functioning is bar ly ufficient to sati fy the averag d mands of th body

Foll w up Care

S bs q nt buses may ause suffi i nt additional nephron damage to bring bout a latent glom rulonephritis Patients with a heal d glome ulonephritis must th refore submit to a moderate but not necess rily r gid prot in res ri tion and should hav urine examinations at l ast once a ye for life

UREMIA (code No 551)

U mia is a phy logical state re ulting from renal insuff ci ncy whi h may be defin d as an alteration in electrolyt balance with re t ntion of nitrogen us and other waste products Although uremia s m st freq ntly seen in the terminal phase of chronic renal d sease it does n t ne essarily imply an early demise Some case of ur mia may ctu lly b cu ed e g those resulting from urinary retention second ry to obstruction In the management of r mia one should r member that the alt rat ons in el ct olyt balance are more important than the el ation of the I P N and that therapy th refore should b a med pr marily at p eve ting and treat ng the acid o is which de lop

P th logical Phys o ogy of R l Insufficiency

A R n l Defe t

1 Glomerular filtration s depressed and p oduc s an levation f th se um N P N ph pha e sulfate nd other acid a... als this leads to metaboli acidosis (s e page 18) The s m phosphat r s s nd th serum calcium tends to fall
2 Tubul r functio is dep ssed and the kidn y lo es its p wer to manufa tu NH_4^+ (which conse ves fixed b se) this leads t l s of th f xed bas s od um potass um and calcium wh h furthe contribute to acidosis (s e pag 18)

B G l M tab li Eff ct Anemia d elops gradu lly due pp ently t bone marrow dep ession Loss of calcium in urine with ons qu nt low serum calcium nd high serum pho phor l ds to p rathyroid hyperpl ia pho pho us can not be xcr ted howeve and rem in s ele ated The serum p ot m y become low r d

D gnosi

The alt ed phy ology lead to the clin al manif st tions of ur m Th s a e a iable In early uremia there may be lethargy

headache pruritus and weakness Late uremia is characterized by acidosis and dehydration In addition tetany may result from lowered serum calcium and muscular weakness may occur if serum potassium is lowered The blood N P N sulfate and phosphorus are elevated the serum potassium is variable and the serum sodium calcium and CO_2 are lowered A normocytic anemia is present Coma is superimposed l ter

Treatment

A Early

1 D et Protein must be restricted to 0 5 Gm /Kg (0 23 Gm /lb) body weight plus th amount lost in urine This tends to reduce N P N and serum sulfate (see page 294)

2 Fluids and electrolyt s Force fluids orally to 3 000 4 000 cc (3 4 qt) per day Give calcium lactate and salt mixture by mouth as for terminal glomerulonephritis (see pag 300) This helps keep the electrolytes in balanc

B Late

1 General measures

a D et As above Protein restriction is very important

b Fluids

(1) Force flu ds o ally to 3 000 4 000 c (3 4 qt) daily *unless patient is anurto*

(2) I V fluids and salts should be given as necessary to maintain no mal el ctrolyte balance (see pag 15)

c Electrolytes

(1) Continue use of salt mixture (see page 300)

(2) Aluminum hydroxide gel 15 cc (4 dr or 1 Tbsp) q i d orally aids in reducing the hyperphosphatemia (causes precipitation of insoluble phosphates in bowel) and so h lps to elev t serum calcium and prevent tetany

(3) Calcium gluconat or lactate 10% 10 cc (2½ dr) I V is useful p r n to tre t or prevent tetany

d Transfusions of carefully m tched whole blood or red c ll mas may be us d to co trol anemia All oth r forms of treatment to combat anem a are without benefit

2 Complications of treatment In the treatment of uremia the phy ician is apt to encounter a therapeuti dilemma In the course of ttempting to corr ct the lectrolyte balan e the amount of sodium that must be administe ed may cause the patient to develop cardiac failure Little can be done for the patient at this time n has almost no ca diac or renal reserve remaining

C Terminal

1 Calcium lactate or glu onate 10 cc (2½ dr) f 10% solu tion I V p r n to control t tany and convulsi ns

2 Magnesium sulfate 1 Gm (15 gr) (10 c of a 10% solu tion) I V p r n for r tlessn ss and convulsions *Caution* Have I V calcium salts ready in syringe (ee page 298)

3 Paraldehyde 20 c (5 dr) in 30 cc (1 oz) of oil rectal ly or 4 8 cc (1 2 dr) I M as n cessary for sedation

EXTRARENAL AZOTEMIA

Ext arenal otem a is th bnormal ac umul t on of nitrog n wa te produ ts in th p s nce of normal or potent lly norm l r l fun tion The most common use is a d creas d ffectiv i c lating blo d volum w th inadequ te glom rula filtrat n s h as oc in sh k d hydr tio etc It also occ s in mas ive ga tro te tinal bleedi g whe e ther i a udd n xcessi protein digestı and ab o ptio pl decreas d circulating blood v lume

Tr tm t

T eatment is aimed e tirely at o recting the und lying n ditio no r l diseas i prese t Flu ds a d electrolytes suff c t t estor the blood hemistry t no mal sh uld be gi en

ACUTE RENAL FAILURE

(Lower Nephron Nephrosis code No 713 y00 9)
(Due to Hemoglobinemia Following Transfusion code No 713 38x 9)

Pathol gi l Phy iology

It ha been d monstr t d th t the c t re l fail e (olig ria b t n t an ri) wh ch o s in a va i ty of t x conditio s pr s nt the ame clini l and pathologi al pictu e i pective of the tiology Th s ond tion i most oft n induced by on f the following (1) intrava l r hemolyti reactions (e g t an fus on rea tions) (2) c hing inju i s (3) bur (4) h mical toxi ity of s me types (g a b n tet a hl ride sulfonamid s tc) (5) tox mia of pregnan y and (6) non tr um tic m ular isch m a Although p th g is vari ble th h topatholog pi tu is th sam p imarily f l d g n ation of th distal v luted tubul with blood a t in th lowe eph on and ll ting t bul s

In m t mild to moderat s s th kidneys will open spontan ously in 1 to 14 d y (if th p ti nt can b k pt aliv th t long) In m e sev s th r n l shutdown m y b p mane t Th vidence sugg t th t if th pati nt urvives o y is c mpl t and that mpl te h aling of th kidn y may oc ur in as sh rt a tim as 2 t 4 w eks

Di gn i

A P od of Shock At the on t ymptom of hock m y b th only finding H me pigm t may b f und in urin

B P iod of R n l Shutdown (M y L t 14 or M Day) The p t ent m y b ymptom t'c b t if th sh tdown pe si ts the m if st tions f uremi will o ur *Weight g in peripheral edema and th rales of pulmonary edema may be found if th patient bec mes overhydrat d due to overtreatment with fluids* Thi drowning is the most com mon u f d th

C P iod of R ve y The diu esi whi h f llow r nal hutdown m y b ma k d and un ont olled and m y lead to dehydration Mu ula w akn ss (d e t low rum pot ssium) and t tany (du to l w erum cal ium) m y oc r Th blood N P N lly doe not eturn t no mal until 2 4 we ks aft initial r ov ry f th kidn y h occur ed

Treatment

A *Emergency*

1 SHOCK S nce many ases are associated with traumatic or burn injuri s the renal ischemia asso iated with shock may play a role in the pathogenesis Imm diate and vigo ous anti shock therapy is important (see page 27)

2 Immediate alkalinization of the urine in cases of transfus on reaction may help prevent the precipitation of acid heme compounds in the renal tubules Give sodium bi arbonate 5 10 Gm (75 150 gr) orally at on e h ck the urin pH every 1 2 hours and give sufficient sod um b carbonate to k ep the urine alkaline

B Oligu ic or Anur c Phas *Management in this phase is very difficult and should be undertaken only by train ed personnel in a hospital able to determine chem ically the entire electrolyte panel* (See p g 15)

1 We gh patient ac u ately daily Weight gain me ns fluid re tention and thi must be avoided Tl ese patients should generally los 0 3 0 5 Kg /day which represents endoge nous tissue catabolic losses

2 Flu d estr tion This is on of the fo emost principles in the apy In the past pat ents were often drowned to death in an effort to promote diu esis Usually 800 1500 c f fluid is th maximum allow d daily If pat ent is not l sing ex ess fluids (as by vomit ng d a rhea or excess swe ting with fev r) the inse sible wat r loss plus ur nary loss is the only fl id wh h must be replaced The ins ns ble loss can be cal ulated as 15 cc wat r/Kg per day How er s me water is s pplied from oxidatio of food o tl s es Th s may av rage as much as 400 500 c per da There fo e the usual fluid requi ements are 400 600 cc p r day fo a 70 Kg patient This may be tak n orally If vomiting oc urs the fluid may be given I V as 10 15% r more con centrated gl co e given lowly and arefully to avoid s b utan ous nf lt at on The p t ent should ne r be allowed to gain weight (ke p an a cur t re ord of weight) for this *probably repres nts fluid retention If the patient is vom ting has diarrhe or s sweat g give add tio al fluids* cautiou ly to repla th s los

3 Electrolytes I the ab en e of vomiting o other extra enal lo ses no el ct olyte replaceme t i n eded Th electro lyte patt n should be examin d daily and e ery attempt made to keep the electrolyte val s w thin ormal a ges Give *electrolyte s* needed o ally or parent ally *In most cases potassium either in food or as electrolyte must be avoided* Giv al ium gluconate 10 (2½ dr) 10% ol tion I V for convulsions

4 Diet A high carbohyd ate and high c l ric diet without protein will prevent endogeno s protein b akdown a d slow down the acc mulation of pr t in b eakdown produ t (i e urea *organ*i acids and potassi m) In th absen e of vomiting a *simp e w y* to supply fluid and f od is as follows Pas a small *polyethylene* plast c tube I tra asally into the *stomach* Calculate the amount of fl id n ce sary ov r 24 *hours* and to this add lactose *and lad oil to give the n m ber of* calories req ired for m int n n mixture

may th be emulsif d i abl d r by add g 2 5 of Tween 80® t the sol t The v l me is d ided i to 24 pa t and a h po t o gi en hourly by syr g thro gh th p ly thyle tube If th pat e t is vomiting 50% or less con t at d gl c e an be g e by I V d p Vitamins sho ld be g v with the h gh CHO intak eith r o ally o I V

5 D gital t on If iden f a d a fil o nl g ment o p l non ry edem d elops mmed te rapid d git l z tion a d ma nt e should be car d o t (ee p g 197)

6 D ess If d res s h ot o d by th 12th 14th day t may be n a y to o t t m ed a t me s s to omb t the is g a otem a d esp ially the hyp kal mia Among tho e wh h ha e b e ad ocated th tif l k dney b t Oral e ch g ı s i test l l vag a d/or p r ton l rr gati n are d fficult to us b t m t at t mes be s d f t f al kid ey n t av il bl

C Re ov y (D r t) Ph The man gem t of th d t c ph e ıs r lati ely s mple ıf th p t th s b e p operly r d for p to th t t m A 24 h ur e s mple ı oll ted The pooled ın th a ly d f total od m d pota ium c t t Th am t f le t lyt nd w t lost per 24 ho ıs th pl ced v the t 24 h Th s p oced e e p ted nt l l f t l s l tivity ha r t d Thı meth d ot p a t l f th p tie t N⁺ o w t ınt k d r g th lıg i ph s h bee ess If th ri t b s ed th p te t sh ld h v da ly se m Na⁺ K⁺ and Cl d t mi atio s Th fl d and l t olyte r pl c m t d te m ed the ba f thes m u eme t (e p g 15) D es s m y o n o of thr w y

1 Diur s w th l t olyte los Th s ety f d u sis g lly ch r t d by an ex t on of a gr at e s f sod um hl d and potas um ın the u in with rapid fall f these ions ın th t llular fluids It m y b nece y to g v 20 30 Gm (2/3 l) of od um c̈hl d p 24 hou s t mp t f th s l U l thı is d n death m y e ult f om hypo hlor m a and d hydr t n Pot ss um hl d m y l o h v t be gi n

2 D u with l t lyt etent on In th se p tı ts the app to b an om lous nd tion of the en l tub le in wh h sodium and hl ide a b rbed e es in la t n t wate In thi co d t n th is ap d r e n e um N and Cl w th th o s t of di is Th py th f ts of mmediat re tri tion of Na⁺ and Cl and the fo ing of lt f fluids

3 Diu s w th o m l l t olyte l

F llow Up

Wh n v y complet of th t tm t i n e ry

INFECTIONS OF THE URINARY TRACT

Inf tions of the in y t act m y inv lv on or m e p rt f th y t m d m y be th hr ic a ut Women a m p than me to inf ction of th urın y t ct and infe t ns a e q it ommon d ing p gna cy Es he i h a li by fa the m st f equ nt inv ding rgan m b t oth py g n c

organisms may also cause infection Diagnosis is usually suggested by the presenting symptoms and signs and confirmed by microscopic and bacteriological examination of a sterile urine specimen includ ing stained smears of sediment and colony counts of the urine 25% of cases of infections may have bacilluria without pyuria

A chronic or recurrent infection particularly if resistant to antibacterial agents suggests obstruction and urinary stasis The final clearing of such infection is dependent upon the correction of the obstruction

General Pr nciples of Treatment

A Correction of structural abnormalities which produce stasis is of utmost importance *in cases with remediable defects* urinary tract infections may disappear spontaneously or be easily cured as soon as the defect is corrected The permanent eradication of infection in the presence of such obstruction is usually im possible The diagnosis of obstruction usually requ res cys *toscopy and/or excretion or retrogr de pyelography* Treat ment is generally surgical

B Treatment of the infection with suitable chemotherapeutic or antibiotic agents as determined by bacteriological studies

1 Careful examinat on of fresh sterile urine specimen (2nd *glass specimen in male catheterized specimen in fem le)* for presence of pus and Gram s stain for preliminary identi fication of organism

2 Bacteriological identific tion of organism and determination of s nsitivity of organism to antibiotic agents whenever *possible The latter is of spe ial importance when strepto* mycin chlort tracy line (Aureomycin®) or oxytetracycline (Terramycin®) are to be used because adequate dosag must be assur d to eradi at infection before organism re sistance d velop (see page 514)

3 *Careful follow up to diagnose and prevent development of* chronic infections

INFECTIONS OF THE KIDNEY

Diagn si

The manifestations of all inf ctions of the kidney re similar but they vary in int nsity with the severity of the infection *Symp* toms include lumbar pain whi h usually ad ates into the lower *genitourinary tr ct* but may radiate elsewhere hills feve and nausea and vomiting as well as fr quency urgency and dy uria Th re is usually moderate to mark d costo ertebral angle tender ness Examination of a sterile urine specimen for pu and organ isms is necessary to make the diagno i and to el ct the proper *antibacterial ag nt*

A Pyelitis (cod No 722 100) Simple infectio of the renal pel vis wh h does not aff ct kidney function

B Pyelonephriti (code No 719 100) Renal infection wh ch de presses kidn y funct on and which in th h onic form may pro *duce eff cts* similar to those of chronic glomerulon ph itis

C Pyonephrosis (code No 722 100 2) R al infection of gr ater se erity than pyelon phr t s w th pus in th ren l pelvis

D Renal and perirenal *abscesses* are s rgical re l diseases

T tm t

A Spe f Measures

1 Ant ba teri l therapy should be given as oon as causative ganism is identified and as soon as s nsitivity tests hav be n ond ted to determine dosag (s p ge 514)

2 Surgical tr atm nt of any remediable obstru ti n hould be c ried out wh n th a ute symptoms have subsid d Diag n tic stud es of the urinary t act should b d f d lso until the acute phase has p ed

B Ge l M su es

1 B d t until complet ly symptom ti

2 Fluids If the kidney function is not d p e ed and there a n other contraindi tio fluids should b fo ced M in t in d ily urine output f 1500 c or more

3 Analg i and sedatives n ess ry for the comf rt of the p tient

C T tm nt of Chronic Py lon phriti There ar a s of chroni py lonephritis in whi h th kidney has b n mode t ly t markedly damaged Infection in these kidneys is v y diff cult to er dicate Addi ggested the co tinu d u e of small d es f sulfonamide drugs 100 200 mg ($1\frac{1}{2}$ 3 gr) t i d q i d (aft oth r m ures have be n taken to eradicat the infecti) in the hope that the e small dos might stop or slow d wn th progr s on of th di Once this the apy is begun it should probably be arried on fo lif

T rmin l py l n phritis is handl d the sam t rminal glom rulon phritis (s p ge 300)

CYSTITIS

(Acute code No 730 100) (Chronic code No 730 100 0)

D gno i

Inflamm tion of th bl dd is many times m mm n in wom than in m n and is m t c mmo ly du to Esche hia col It mu t be d ff e tiat d f m r th iti whi h has simil r manif t tions

A Sympt m Mainly dysuri urg ncy and f equency If s vere th is t smus and at times urin y r t tion Chills and fe er m y oc ur Wh n inf ct n is v y sev hematu i may devel p

B Signs Suprap bic t d ness m y be p esent

C Lab tory Ex mi ti n

1 Organ sm and pus will be found in the urina y sed m t f a p operly oll t d spe imen

2 O gan m mu t b id tifi d by amin tion of t in d smea (methyl blu r G am) and by cultu fo p oper lect on f th antib terial agent (s page 514)

3 Two gl t st m y be used t differ ti te ur thriti from cy titi in the male E amine the urin gro ly and mi o scopi lly If the urin in th cond glass i l th in fe tion is in th ureth a If all urin is turbid the bladder is inf cted (U 3 col less beak s or glass)

a First gl s on i t of 4 8 c of urin and c ntains th elements f om th ur thra

b Second gla s contains the remaind r of the urin from the bladder

c A third glass may be collected after prostatic massag In this method the patient must retain some urine in the bladder to wash out any residual mate i l

D Cystoscopy May b n cessary to determin th presence of obstruct on upper urinary infection or source of bleeding This must not be done during th acute phase

Tr atm nt

A Spe if c Measures

1 Ant bact i l agents Select the appr p t drug by bact ri ological examinat on and s n itivity tests (see pag 514)

2 Surg ry Correct any rem d able obst uction after the cut stage has subs d d

B G ne al Measu es

1 Bed rest if severe

2 Fluids If urination is painful fluids should not be forced Wh n dysu ia h s sub ded maintain a h gh urine o tp t

3 Bladder sedatives and analge

a For s r pa n Mild local an sth sia can be obtai ed by bladder instillat on of 2% olution of P perocaine Hydro chlor d U S P (Metycaine®) or 1 1000 (0 1%) sol t n of Dibucaine Hydr hlo de U S P (N p rcai e®) Allow the an sthet to remain in the bladd r fo 10 minutes by plac ng a cl mp on the catheter After drain ing off the anesthetic inst ll 10 c of 5% solution of mild silver protein or 1 10 000 silver nitrate s l tion and leave in the bladd r

b For tenesmu T eat as fo dy u a (p g 292)

TUBERCULOSIS OF THE URINARY TRACT
(Kidney code No 710 123) (Bladder code No 730 123)

Chronic tub r ulosis of th urin ry tract ually oc rs first n th kidney and involves the bl dder second rily A history of bladder irritation s usually pr e t the u ine ontain pus and a f w r b but there g n ally re no o gan sms Th urinary s d m nt must b examin d m ros opically and bacter ologic lly (culture and guin pig in cul t n) for ac d f st bacilli If tubercl bacilli a found d termin the primary urog nital s te of the infe tion and wh th r renal d s se s unilat r l or bilate al

Tre tm nt

A Tre tment of ren l tuber ul w th the n wer nti tub r ul s ch motherapeuti agents tops p g ession and m y effect cures in ome cases Th r py s th am as th t advo at d for pulmonary or other syst m t b culosis Th use of nter mittent streptomy n plu ami o ali ylic acid (PAS) a d/o isonia id fo lo g per od (1 to 3 y r) h b ad c t d (see page 133)

B Su gery If unilateral tuberc l s s fou d and if the kid ey s ser sly invol ed nephrectomy with subs q t strept my in therapy should b onside d Thi would appe to h lp to

cu e any low t t tube culos s that m y be prese t
C Sympt m tic and support v mea ures as n e ry

OTHER DISORDERS OF THE URINARY TRACT

CARCINOMA OF PROSTATE
(Adenocarcinoma code No 764 8091)

Diagn

Th vast m jo ty of prostat inomas can b di gn sed by th f ndi g f hard gland o rea w thin th gland on r ct l ex mi nat on C nf m tion of th di gn i is mad by eedle biop y and th fınd g f an l v t d a id um phosphatas X r ys f th p lvis and lowe spın ar tak n to d t mine the p nce of m t t

T tme t

A E ly C e T atment of cho c r dical surgi l remov l Th s s d only fo s in wh h (1) there is no evid of met st ses (2) th gland not f ed t s ounding ti ue (3) th p t e t i oth rw a good su g l risk and h s a g d life expectan y

B All Othe C s s

1 H m n th py Th trogens h v been f und t be of gr t be efit in li ving the pain s i ted w th m t t s and ın ar t ng th p ogress f th d sease (ın ome cases t lly au ing a r gr ion) Th w de t exp has b n gai d w th D thylst lb t l U S P St lbest l B P a d Eth nyl E t d ol U S P

a Dos g

(1) A e g m t na c d ge D thyl t lb st l 1 mg eth yl t dıol 0 1 mg p day o lly f lif

(2) If o p pons m y in f ll w D thyl tilb strol 2 3 mg th nyl t diol 0 2 0 3 mg p d y

(3) Som tho t f l t th t of th py o e sh uld gı e d thyl t lbestr l 5 10 mg ethinyl t dıol 0 5 1 0 mg p d y

b Toxı gns

(1) Nau and mitıng m y u b t u ually d sapp the drug i co tınu d If e dımıni h dosag and ın e s t leran de elops

(2) F nful a d enlarg d b easts usually d v l p on con tınu d d g but th s no c t indi tion t n tın d th r py

2 O hiectomy Th esult to d t s gg t th t bil t l o hi t my pl est g ns f great lu tha tro g n l ne

3 Ge e l upp tiv m asur s uch as g cal mov l of p ost ti in y b t uct on tc hould b empl yed

4 Bilat l o hi ctomy nd ad l t my (with co tis and estrog mai t anc) in o d t emo ll p bl d o g must till b o id d p m tal Th ult in

most cases seem little better than orchiectomy plus estrogens alone

UROLITHIASIS
(Renal Calculus code No 719 615) (Ureteral Calculus code No 723 615) (Renal Colic code No 711)

Renal colic is usually caused by the passag of a renal calculus into and down the ureter There i a sudden o set of severe lumba pain on the affected side radiating to the groin bladder teste inner thigh or other adjacent areas The pain requires narc tics somet mes in large doses for relief Nausea and vomiti g may occur but o other constitutional symptoms re present u l as there is a pre ex sting infection Urine output is r duced and hematuria is common stones may pass w thout symptoms

T eatm nt

A *EM ROENCY MEASURES*
1 Nar otic for r lief of pain Th se may hav to be r peated if p in is s vere
   a Morphine sulfate or hydrochloride 15 mg (1/4 gr) I V o sub ut Stat Atropin sulfate 0 5 0 75 mg (1/120 1/80 gr) may be given with th morphine
   b Mep r dine Hyd ochlorid Injection U S P (Demerol® Dolantin®) 0 100 Gm (1 1/2 gr) I M or orally in plac of morphine This has a minor atropine like effect in addition to its narcotic action
2 Heat over the affected flank and l teral abdominal area may give some reli f Thi can be given as w rm moist towels heat pad or warm tub bath

B Ge r l M a ure
1 Fluids If patient does not d velop anuri o oliguria fluids should be for ed in o d r t m nt in a h gh n flow Gi e fluid I V f v mit ng pre erts oral admi ist ation
2 Check carefully fo pa s g of to If th a does ot o cur xam ne by x r y f r posit on of st ne
3 Att mpt to r o er st ne by ha ing pati nt void thr ugh a f nnel lay red w th se eral thickn ss of gau a d ana lyze h m lly to determ e type of stone (al um phos phate r t cy tine tc)

C S rgery If a stone be omes lodg d in the uret r it should be remo d s rgically to prevent hydron phro is

D Coe i ting inf ct on should be tr ted with suitable ant ba teri l agents (s e page 514)

Prophylaxis

A Co cti n of Unde lyi g Dis ase Tr at a y d sorder which may a e or a t sion format on Th include hype par thyro d sm (e page 377) u i a y ob t u ti n uri y infectio (see page 306) gout d ra ly ystin ria *Every patient with urin ry tract calculi should ha e at least one erum calcium and phos horus determi ti n to rule out h perp rathyroidism*

B Fl d Any patient who has had a e l c l l ho ld d ink large amou ts of fluid at all time I c s s of u at o cysti e stone the urine should be k pt alk li if po ible

Chapter 12

DISEASES OF THE MUSCULOSKELETAL SYSTEM

INTRODUCTION

Cl f tion f Rheum ti D

1 A th t due to pecif c inf t on a t or h on c
2 Arthritis du t h um tic fever
3 A thriti rh m t d
4 D g e ati joint d s s
5 A thr tis du to d e t trauma
6 Arthriti du to go t
7 Oth thropathies (du t u genic neopl ti m ta bolic ascular h m t g nou allergic to and un known cau es)
8 F br s tis myos t bu sitis

Exam tion of th P t t

Th m t on of the pat nt w th heum t c d as hould include a car f l h st y and phy ical xamin tion with sp l mpha on d t mining th fun t l tat s of th joint (ra g of m tion ankylos s d fo mity atrophy t) Routine labo to y st d s bl od s dim nt ti at and x r ys of mor of th in lved joints ntial to ompl t th d agno ti p t e Add t n l st die may incl d determinat on f the blood uric id sp t on and x min t n of jo nt flu d and cultur l immu o logic and oth te ts for sp ifi infections Th e tud s r mp rtant not o ly f m a di gn sti tandpoint but l er e to p ovid b line for planning the ther py and val ating th lin l p gress of the pat ent

The d ff ti l d gn f the 4 m j f m f arth itis e to b found in the t bl on page 312 a d 313

RHEUMATOID ARTHRITIS (code No 24 1x0)

Rh um t d arth ti (p f ably h um t id dis s) is h ic d bling sy t m c d as of und t mined o igin It is o din ly s d d a inv lving p imarily th joints b t it is ctu lly p bl of inv lving m t of the t of th body partic ula ly tho of m od mal o igin in l ding lymph nod s bo m rrow l spl ga troint st l tract entral n rvous y tem ye p dium kidn ys conn tive ti es and th mus latu e Th d e s m y involve any or ll joint and is f va ying e r ty P ri t ular sw lling is p omin nt in th

DIAGNOSTIC CHARACTERISTICS OF THE MAJOR FEATURES OF ARTHRITIS

	Rheumatoid Arthritis	Arthritis Due to Specific Infection	D generative Arthritis	Arthritis Due to Gout
Family history of similar condition	+		+	+
Past hi tory	Frequ nt inf ctions	History of specific infection		
Sex	Most common in women	Either sex	B th sexes	Usually men
Ag at onset	Any age us lly 20 50	Any age	Us ally over 40 year	Usually ov r 35 ye s
G ner l physic l st tus	Poor undernourished	Acute good Chronic may be poor	Good but may show othe senile changes	Good
Typ of onset	Insidious (subacute)	Acute infection sudden. Chr ic infection slow.	Insidious (slow)	Sudden (cessation of symptoms also sudden)
Fe e	+	+ (especially acut)		+ (during acute episodes)
Joints involv d	Any joint ft n symmetrical with tendency to spread centripetally Proximal finger joints sp ci lly involved	Any joint pyogenic forms are usually mon rticular Non pyog nic forms are often polyarticular	Usually the large and weight bearing joints Also distal joints of fingers	*Any joint mo rticular or polyartic lar* Especially involves metatarsophalangeal joint of great toe
Periarticular swelling	+	+		+
Ankylo	+	+ (pyog n)		
Mu le trophy	+	+		+ (lat)
Deformitie	+	+ (pyogeni)		+

Cutaneou changes	Skin over j int trophi and glo y	Sim lar to heumat id rthritis	Se ile hanges	E ly N n Late Similar t heuma toid a thritis.
S bcut od le	+			+ (tophi)
A mi	+	(ly) + (chron)		
L uk yto i	±	±		± (du ing a te p od)
Blood s dime ta ti te	+	+		+ (du g acut pisode and chr ni ph e)
Hype uricemia (blo d ic a id)				+
Char t r f joint fluid	Non pu lent (ste il)	Purul nt n p rul t (s pti)	Non p ul nt (il)	N pu ul nt (t il)
X ray appearance f joints	Early G n lized de cal ifi tion of bones and joint effu i n Late Nar owing of j int space bon d st ti ankylosis	Sim i r to rh um t d arthritis but bony de calcifi tion more p minent near in volved joints	No hanges until late tag auses lipping osteophyt s and nar wing of joint p e	Early Normal Late Punched out appearan
Sp ific' therapy	Peripheral G ld alts Spinal (spondylitis) y	Sp if ant' inf ti agent	None (l' yl t s?)	C l h'cin
Other di g tic fe tures		B t ological and immunological evi dence of pe ific local o systemic infe t on	Some lini ians in clude m n pausal arthritis in this category Estrogens are f value in e of gonadal d ficiency	1) E rly in di a e be tw n episode p tient is asympt matic and ther is no resid l joint involvement 2) Tophi C ntain urate cry tal

peripheral joints early in the disease and ankylosis and deformity are common end results

Diagnostic Features

A Cl nical Manif stations (See also the table on pages 312 313)

1 Non articular manifestations may i clude weakness ano rexia fever weight loss cl mminess of skin mu cular aches nd tremors iritis migr tory pleu isy adenopathy anemi and involvement of other above mentioned body tissues

2 The acute form of the disease is rare but may run a se ere fulminating course associated with high fev r chills cachex a and a rapid death

3 Mild or transient types of rheumato d arthr tis may oc ur

4 Alth ugh certain joints are classically involved any or all joints may be involved Joint nvolvement may b monarticular but this is rar

5 In rheumato d arthritis of the spine (rh umatoid spondylitis), the patient may or may not b oth rwise healthy but will develop recu r nt low back pain associated with progressive stiff ess of the spin and reduced ch st expans on often without significant involvement of the peripheral joints

B Laboratory Data

1 Inc eased blood s dimentation rate and less commo ly leuk cytosis are considered to be evidenc of clinical activity

2 X ray hang s of joints and periarti ular structures may be quite charact rist c (see p ge 313) and helpful in differen tiation from ost oarth tis although osteoa thr ti changes may oc ur coin identally in rheumatoid a th itis and thereby confuse the p cture

Narrowing of joint spa s a d ankylosis of the sacro iliac and apophyseal joints and alcification of the anterior and later l spinal ligaments m y be demonstrated in rheumatoid spondylitis

T e tm t

A Gene l Me ure

1 Rest

a Acute illn ss Compl t bed r st should b reser ed for th pati nt w th the a utely acti e or sever rh umatoid arthr ti Sp cial care including exe i s should be used to preve t d fo mities in b d patients and the af fected joints should be pla ed in th optimal fun tional po ition

b Mild chro ic illness 1 2 ho r rest p riods during th daytime a well as 10 12 hour est in bed at night are essential Analgesics and sedative drugs (not n r otics) and physical therapy may be used j d iously to insure relax tion r st and sle p

2 Physical activity Carefully r gulate the d ily sch dule of activities of the patient and allo at period for work play and exercise as well as for rest

a Ambulatory pati nts It is su lly necessary to specify the hours and physical limit tions for ambulatory pat e t according to the demands of the individual ca e

b B d p tle ts It is imperativ to inst tut a p ogram of daily systematic s to pre ent joint stiffness and m l at ophy Ref r to th s t on n physical manag m nt f arthritic joints (se p ge 323)

3 Diet Food ho ld be imple nou ishing and p lat ble An d q te p otein and h gh vitamin diet is us ally dvis bl Since g st intestinal disord a e f q ent in rheum toid arthrit s it i often necess ry to modify the diet to tol rance C lo ies should b in ea ed or decr as d ding to the p t nt weight

4 D etary s ppl ments
  a Iron salts m y be indicated if anem a i p esent (s e p g 219)
  b M lt vitamin The s of eptable m ltivitamin prep arations as g ne al health bu lding m a re m y be in d ted although t i probabl that one of the vitamin has a sp if therapeuti ffe t on this ond tion V tamin D H gh poten y vit min D pr parations in d ily d g ranging f om 50 000 300 000 units in d id d do s ha b n p pularized s b ng of great v lue Toxicity of the vitamin D mpounds in p long d or x i d ses s d f n t and their ff ct veness has be n ques t on d by many inv t g t s Oth individual vitamin h f l d to dem nstr t ignificant b fi ial re lts

5 Elimination of pr ip t ting facto
  a Inf ct s E aluate the ol of syst m c fo al infec t on only as th y may apply t th individ al pati t Elimin t pe ific inf ction when v r po ible Defin t ly inf t d te th t ils etc m y be r moved o t eated as d t d It s b st to maintain a on ervat v att tud t w d the elimin tion of qu t n ble fo al inf ti s espe ially when the e tion w ll invol e extens ve m j su ge y Anti inf tiv ge ts sho ld b gi en only to comb t p ifi inf tion and not th h mat d di s p
  b P ychog n c fa to s F quently h umat id d s ha it ons t whe th p tient is w king and living in a har ing tm pher wh he i s bj t to undu an t e h t l ties o s tments
  Imp op living hyg For co t on of u h f cto s s tions on t physi l activity and d et (abov)

6 P y hoth apy
  a R sure pati t and r l ve e isting an tie
  b Regul t p tient s n onment t minimize mot onal dist
  Ke p an optim ti and ch f l att t d
  d Expl in the n tur of th di se and th l th pati t him elf pl ys in ov ming his illn
  e Enlist id of a t ain d psy h t t in app op iate s

7 R li f of p in *Avoid narcotics*
  a A lg i drug Give an lg ic l b ally if t l r t d t reli ve p in an aid in p eventing muscle p m and defo mity
    (1) Sodium sal ylat 0 6 Gm (10 gr) (nt i oat d t p ent gast ic di t ess) v ry 2 4 hours p n p in

(2) Acetylsalicylic Acid U S P (aspirin) 0 3 0 6 Gm (5 10 gr) every 2 4 hours p r n pain

(3) Analge ic sedative mixture

℞ Sodium salicylate 10 15 3iiss iv

Elix r ph nobarbital q s ad 120 iv

Sig 4 cc (1 dr or 1 tsp) every 4 hours p r n

b Sedative drugs Barbitur tes can be used effectively in enhancing the action of the analgesic drugs Phen barbital 15 30 mg (1/4 1/2 gr) 3 4 times daily

c Physical therapy Physical methods utilizing local heat to involved joints and proper splinting are effectiv in re lieving pain and muscle spasm (see pages 323 334)

d X ray therapy is of no value in peripheral jo nt involve ment of rheumatoid arthritis in rheumatoid spondylitis however deep or penetrating x ray therapy carefully administered in repeated courses has proved to b of value This treatment must be administered o ly by trained x ay therapists

B <u>Ho m ne Therapy</u> The hormonal and steroidal ag nts used in tre tment of heumat id arthr tis although they do r present a signifi ant ad an e m st be con idered as o ly anc llary meas res to the omprehens ve approach and should probably be used only for patients who do not make satisfactory prog ess on mo e conservati e treatm nt Perh ps th great st dis d v nt ge which m ght stem from their us aside from th ery serious p obl m of untoward re ct on lies in the tend ncy of pat nt and physician to eglect the less sp ctacular b t pr ed b nefits wh h m y be de ived from g neral suppo ti e t eat me t physical therapy and orthoped c measures Th s agents do not ep sent th lo g awa t d specifi antirh u mati fa to and do n t cur the di ea e

1 Corti otropi (ACTH) nd the ort o s produc startling res lt in a ute h umatoid arth it s b t the ondition re gre s s promptly when the dr g are di o tinu d S bjec t ve imp ovement may appea w thin 6 48 hou s after the init l dos but bje tiv hanges s ch as in r ased m b l ity of joints a d dim sh d well ng oc ur m r slowly and less constantly Th pe iod of m ssion following discon ti uation of th s d ug r s f om a few d y to a few months It s ms th p n pal nd ation fo hormonal the apy i rh umatoid rthrit a fo the ontrol of th a ute a erbat ons and the p tio of rapid p ogression d e to e ten iv inflamm to y re ctio Optimum dosag chedules ha ot b n st bli h d lthough t now appears that s tisfactory ult an b obt d with sm ll r or more ons rvative do s th n fo m ly mploy d Initi l dos s of 75 100 mg ort s ne daily (orally o p e ter lly) sho ld b gi en until ontrol is a hi d Mai t na e levels of 15 100 mg da ly m y be onti u d ind finit ly Some obser er adv se r st p riods of 1 month b twe n the 4 6 we ks courses Howe er the drug ha b n u d tinuou ly in many pati nt f r ev r l y r witho t app r t harmful ffect (se page 423 for fu th r discussion of phys iol gy d sage toxi ity et of th co ti on)

2 Hyd o o liso e A etat U S P q eous suspension 10 37 5 mg intra a t cularly after withdr wal of effusion fluid may b helpful for the very painful, acutely in ol d joi t

C <u>Gold Th rapy (Chrysothe apy)</u> Although g ld alts h v b e u d t i ly rheumat d arthritis th ir v lue emains highly cont ove sial

1 Ind cations Gold the apy s indicated *for active rheumatoid arthritis only* Som lini ians f el th t it should n r be used othe s th t t h uld be s d o ly after a r ason bl trial of ons r ative me sur s has failed st il oth rs that the chanc s for c mpl t r mis ion may be b tter if gold th rapy is u ed early in the d s a e

2 C ntraindication Nephr tis h patic in ufficie cy blood dys r s a (includir g an mi) hem r hagic tendencies pr gnancy str ng p rs nal histo y of allergy or all rgies s vere diab te mellitus a ute gene al z d skin disorders ul er t ve colitis acute heumati f r and tub rculo s

3 Pr p r tions and dosag s The gold alts a e usually giv n on e a week b ginning with small do e as ind c t d b low The we kly do e is inc eased gr dually until the maximum optimal dos is being giv n this amount is then continued w ekly until th de ired r sponse is obtained th maximum amount i giv n or toxic r a tions oc u One or two or mor ourses f 1000 t 2000 mg of gold salts are given with a e t f 2 6 month betwe n cou s The v lue of the m ntenanc dose i maller dose at r gular i t vals und t rmin d v n am g ardent suppo ters of ch ysoth r py although many w rkers a employing thi plan at p es nt

GOLD PREPARATIONS

Pr pa ati n	Rout of Injection	Given a On Dose Ea h W k F rst W ek Do age	 Amount of Inc ase p r W ek	 Optimum Maximal We kly Dos
Gold Sodium Thio-ulfat N F (37% gold in qu ou S l)	I M o I V	5 mg	5 mg /week	Females 50 mg Males 75 mg
G ld Sod m Tri malate N F (50% g ld in qu ou Sol) Au oth ogl os N F (50% gold in l spensio)	I M only	10 mg	Incre e t 25 mg in 2nd week if toler t d incr ase to 50 mg in 3rd week	50 mg

4 T xic reactions An ave age f 37% f patients (rang in variou s ri s 8 81%) experi n to i eactions The mo tality ate is b ut 0 4% Th t xic ffect of h ys th r py are imilar to th se of oth r h avy m tals not bly arsenic (s e page 535) and include de matitis (mild t ex f li tive) ag anul cyto is purpu a hep titis nit itoid

reactions bronchitis aplastic anemia peripheral n uritis nephritis and photosensitiz tion

a Reduction of fr que cy and severity of to ic reacti ns Obs rve for th co trair dications ment oned above Ob serve patient caref lly du ing the course of gold therapy and for a period of sever l weeks ther aft r Pat nts who are to receive gold therapy should have a complete medical e aminat on Before each subsequent injection ask patient how he has felt since the pr vious inje tion examin the skin and mucou membranes for derm titis or purpura examine the uri e for albumin a d micro scop c hematuria E ry 2 w eks obtain Hgb WBC and d fferent al When indic ted p rform spe al tests such as plat let cou ts or liver funct on tests Warn patient ag in t exposu e to stro g light *Withdraw* drug imm diately f any toxic reactions appear Wait f r a few weeks f reaction is m ld and cle rs promptly treatment may be resumed with small dos s There is no known method of decr asing th tendency to toxicity in a given indiv dual ex pt perhaps through red ced dosage

b Treatment of toxi rea tions *Withdraw* drug immed iately if ea ly toxic reacti n ppear Treat react ons as for arse ical po s ning (see pag 536) Try d mercaprol (BAL®) on all case (For treatm nt of agranulocytos s see p ge 23))

c Masked to icity If gold salts a e used du ing hormonal therapy a toxic reaction may be m sked appearing with explosi olen e when the hormo es are stopped Therefo e u gold alt with g e t auti n dur ng hormonal the apy

OSTEOARTHRITIS (code No 240 912)

A chro i deg n rat ve joint diseas of undete mined ca se usually of l t adult life a soci ted w th varying degre of symp toms and/or d sability of mult ple joints Ankylo is of j ints does not take place x ept in the spine

Di gnost c Fe tures (S e tabl on pag 312 313)

A The dis a may xist w th a compl te abse ce of symptoms when symptoms are pres nt th y ar us ally mild

B Joint Sympt ms In lud

1 Stiffnes which imp o es w th m ld a tivity
2 Aching and pain aggravated by o era ti ty or injury and reli v d by heat r st and mm bil zation
3 Swelling us ally with t jo nt effusion
4 Deformity and m l lignment o cu s as a result of irregular d g ne ation

C S co d y Sympt ms Radi l r pains oc u wh n joint hang s in th spine u irrit tion of the spin l n rve roots

Tr atm nt

A G n r l M asur s M st of the g neral m a r s discu sed for the t eatm nt f rheumat id arth iti a ppli abl h re

also Emphas s m st be placed up n

1 Ad quat di t with total calo ies adj sted to me t the pa ti nt s body needs W ight reduction is v ry important in obes patients to help dimini h stress on joints
2 Adequate r t and l ep Avoidan of ov rfatigue is e pecially imp rtant
3 Avoi lan e of phy cal act vity which would c use undue tra ma to j nt
4 C rrect p tu (page 334 1)

B D ugs

1 Sal cyl tes are ind c ted fo the reli f of pain a in the c se of rh matoid rthritis (e p g 315)
2 Thyr id extract m y be indicated in th se patie ts who ha e oe isti g hypothyro d sm

C For local tr tm nt of joints see page 323 C mplete rest and immob l at n of in olved j int for ho t periods m y b in stituted w tho t fea of ompli ating ankylo is although one mu t cons de oth r harmful effects of bed rest in uch pati nts (p ge 2) Hyd o rtiso e Ac tat U S P aqueous su pen si n 10 37 5 mg intra articularly may b of g eat val in ac te pai f l l cal j int invol m nt

TABLE OF DIFFERENCES IN RESPONSE TO THERAPY

	Rh um to d A th itis	O teoa thritis
Re t	Compl t r t and im mobili ation ar attended by dang r of ankylosi	Complete r st and im mobilization of j ints a oft n indi t d for v ri ble p riods Litt dang r of ankyl sis
E e	E mild se p o duces di comf rt in the cute phase of th di a	M ld se d c ase stiff e s and d scomf rt b t undue exe cise in cr ase stiff es
Ma sage (do btful lue)	L ght mas ge er th joints may be indi ted in the co val cent or h nic dis a	M s g sh ld be avoided dire tly over the bo y overg owths of the in ol d j ints
Ch ysoth rapy P ripheral joints	Often ffe tive	No respons Not indi at d
Sp	No r pon N t ind ted	N p t d cat d
X r y th apy P riph l j int	No r spon	S m time ff ti e re lief of pain
Spin	Oft ffe t v el ef f p in	U lly no sp n

GONOCOCCAL ARTHRITIS (code No 24 103)

A specific infectious arthritis caused by Ne sseria go orrho a (gonococ cus) occurring as a secondary complication of primary i fection of the genitourinary tract or conjunctivae

Diagnostic Features

History of previous genitourinary or o ular go o occal infection and possibly of genitourinary traum *Rheumatoid arthritis complicated by unrelated gonorrhea occurs more commonly than gonococcal arthritis per se*

A Ba teremic Phase
  1 Fever M ld to mod rate Oc asionally chills
  2 Labo atory findings
    a Leukocytosis Mild (10 000 15 000)
    b Blood c ltures Rar ly positive

B Arthritic Phase (J int T ndon and Bu sa I volv m nt)
  1 Ea ly Evanescent polyartic lar jo nt involvement of 3 7 d ys du ation Joi ts red warm swollen and painful
  2 Late Knees (74%) ankles (56%) feet (32%) wr sts (16%) most fr quently n olved joints
    a Joints init ally red warm swollen and painful
    b Ankylosis may occu in untreated cases
  3 Laboratory findings
    a Gono occal omplement fixat on te t Doubtful value esp cially if po iti since posit v complement fixat on tests are known to persist ma y years aft r g nital in fections
    b Cultures of synovi l fluid with special cultur media are th most reliable method of diagnos s but a e diff cult to pe fo m

Tr atm nt

A G n r l Me su S e g eral meas re a d scussed in management of rh umato d arthrit s (pag 311) and physical m asures in the management of the a ute phase of involveme t of the va ious joints (page 323)

B Spe if c Tr atm nt Penicillin 25 000 50 000 units I M every 3 hours for 7 10 days If improvement is not apparent in 3 4 days g ve intra artic la injections of peni illin 10 000 20 000 units daily into the l rger involved joints

BURSITIS

(Du to Infection Ac te code No 25 190)
(Due to Tr um Acute cod No 25 4x0)
(Due to Unknown Causes cod No 25 930)

Bursitis is an acute or chronic inflammation of ny of th n merous bursae of the body it may e ult f om t a ma acute or chronic inf ction or from unknown c uses Lo alized p in t nd ness and *swelling* may be obs rved at points around joints co res ponding to an tomic bursae Pain and limitation of moti n of adjacent joints are common E largem nt and c lcifi tion of bur sae may be demon trated rad ologic lly at time

A G n ral M asur s Analgesi (see page 32)

B Local Measu es
1 Re t and support of in olv d area by ling plint bandages tc
2 Loc l heat o cold Topic l applic ti ns (ee pag 334)
3 P o ai Hydro hlo d U S P 0 5 2 0% nj ct o
4 Hydro o tisone A et t U S P queo s u pension 10 37 5 mg has been ep rt d to pro de relief of a ut bur itis when inje t d into the bur a
5 Aspi ation of fl id from bu sa Fluid should be exam ed
6 X r y th rapy in sel ct d c e (by pe i li t)
7 Surgi l emoval in s le ted cas s

FIBROSITIS OR FIBROMYOSITIS
(Periarticular Fibrositis code No 24 x40)
(Chronic Myositis code No 27 190)

A l rg loos ly defin d group of a ut or chronic involvements of sub utaneous tissu s f brous tiss s f muscles and joint cap sul f ial ligament t ndon and fibrou onnecti tis ue of c rt n p riph al n rves due t a wi l va iety of au es most of which a not ccu at ly d t min d Th cond t on m y be man fe t d by pain tenderness or stiffnes of any involved portio of the body Clin c l and labo at y findings ar minim l or abs t

A G n l M ur s.
1 El minate aggravating factors
2 R st S e ction on phys cal manag m nt of joint dis s p g 324
3 Analge ic (e p ge 3)
B Lo l M su
1 Local heat (ee page 334)
2 P oc in Hyd ochlo id U S P 0 5 2 0% inje tion into t gg r areas (Of doubtf l alue)
3 X r y the py (by a sp ci li t) in s l ted s s wh ch f l t respond t other th py
4 Massag and grad d er s s may b valuable
5 Str tching of th in ol ed st uctur s pre eded by lo al heat r old o t y proc ine inf lt at on m y give complet lief in one t atme t If only parti l rel ef is obt ined the p o du e may be repe ted daily

GOUT (code No 010 741)

A d e s of unknown etiol gy chara t iz d by e ur ing a ut rthritis du to d po it on of sodium urate in th arti ul r and p ri rticula t ssu as w ll as in soft t s e rea throughout the body Recur ent atta ks of a ut arthritis epa t d by om pl t ly a ymptomati pe iods is alm st pathognomonic f gout and th finding of tophi i diagnosti An l vat d blood u c acid l vel s ery ommon ven in asymptom tic periods X ay id e of punched out are s bout th joi t i almost d gnosti but thi o cur lat

Treatment of the Acute Attacks

A Specific M asures

1 Colchicine U S P B P is the drug of choice it should be given as early as possible in the acute attack or during the prodromata to obtain maximum benefit G ve 0 5 mg (1/120 gr) every 1 hour or 1 mg (1/60 gr) every 2 hours until th re is relief from pain or until nausea or d arrh a appear then stop the d g The usual total dose to ach eve this is 4 8 mg (1/16 1/8 gr) and the pain and swelling will subs d in 24 72 hours Once the patient kn ws the dos that pro duces toxic symptoms the drug should be gi en in a single dose of about 1 mg (1/60 gr) less than this Then co tinue colchicine 0 5 mg (1/120 gr) b i d q i d until attack has completely subsided If diarrhea b comes too se ere treat as for any acute diarrhea (see page 258)

2 Corticotropin (ACTH) and the cortisones provide dramatic symptomatic elief in acute episodes of go t and if gi en for a sufficient length of time will control mo t acute attacks without relapse Since colchicine seems to be about equally effective and provides a more lasting effect it still appears to be th drug of choi e It h s been observed that when co ticotropin and cortisone are dis ontinued shortly after t rmi atio of atta ks many pat ents promptly relapse un less colchicine is gi n

B Gen ral Measu s

1 Drugs

a Analg sics At time the pain of an acute attack may be so s vere that r li f of pain s n cessary bef re colchi ine becomes effe tive In these a s codeine with or with out a pirin may be given Morphin should be avoided for fear of addiction in this chronic dis ase

b Cinchoph n o neo inchoph n hould not be used

2 Rest B d rest s em very important in the management of the acute attack Bed r st hould be ontinued for about 24 hours after the acute attack has ompletely subsided Early ambulation may precipitate a recurrence

3 Phy ical therapy is of little valu du ing the acut atta k although hot or cold compre ses to th affected joints may make some patie ts mor c mfortable

Interim Treatm t

A Sp cifi Meas r s Ther py im d at pre ntion of cute at tacks has been ge erally q uit di o aging

B G n ral M a u s

1 Diet Mo t low p ri e d ets (low weekly allowan e of me t a d avoidanc of k dney li r swe tbr ad sa di es an chovies me t xtr tives) tend to become tritio ally in adequate and often fail to infl en the hyperu icemia or cour e of the d s ase How ve i go ty a th iti the e striction of high p ri e foods app ar to b of som impo tance in p evention of prog ession of th dis s If specific foods or alcoholic b v rag pre pit te atta ks these should b avoided How r the is little evide ce that alcohol in moder t o will pr cipit te ttacks or is other wise harmful in pati nts with gout

2 Colchic ne prophyla is is q estion bly e If it doe

not influe e th in d nc of attacks c l hi in hould be re e ved f t pisodes

T atm t f Compl cat ons

A Chron G uty A th t In rec nt y ar th outlook for pati nts w th th d h g tly imp ov d In many ca e the p gr s of the d s ase is arrested and in m ctu l b sorption of g uty d po ts may oc ur This cond t on s b st treated by a low purin d t and the n w r ur cos ric drugs

1 U ur drugs

a Prob necid N N D (B n m d) ag nt which blocks the t b lar r bso pt on of filte ed u ate has b p t d to reli ve chronic go ty thr tis dos of 0 5 *Gm (7½ g) b d q d over lo g p riods It may* be g e indef t ly f tophi are vis ble the blood ur d l l s gr ate tha 7 mg % if tt ks a f q t The in ho ld b k pt alk lin with sodi m b a bo at or sod m citrate and fl d intake h ld b h gh A t episodes of gout may o ally be p ec p tated by this t tm nt but t is l um d th t th att k dimin h aft r co tinu d tr tme t Full d e of colchicine m y b d w th B m d®

b Sal ylat La g d of al ylates up to 5 Gm (75 gr) da ly have be n repo t d t prod u cos c ff t m l to the abov w th l f of symptom Do ot s co cu e tly w th B m d®

Ph ylb tazo N N D (B tazolid ®) has be n re po t d to p ovide eli f te a d hr n g ut m pan d by low g of rum c d but t s a el ti ely d g us g t e pe ially whe u ed f lo g p od It dmin t d lly t o t d 100 mg tablets 1 3 t blets daily s n d d To ty lud a h p t t t v t f p pt l e t go ash d ed ma

2 S g ry m y offe om h lp in elie ing me hani al de formit s b t is not lw ys eff t v

B R l Compl t on Th form t on f e l l li m y be d c d if p t nts ar n ourag d to d ink at l ast 3000 cc f flu d da ly On al uli ha e f m d l ttle an be d to d s lve the ston s altho gh forcing fl ds and alkalinizing the in w th 8 16 Gm (4 dr) f od m la t te d um itrate per day may b h lpful at l t in p v nting furth ston s f om f ming

PHYSICAL MANAGEMENT OF ARTHRITIC JOINTS (PHYSICAL THERAPY)

G n l P i ipl

C t in ge l p in ipl s which apply to th t eatm nt of dis as d joints d mphas s

1 Arrang pp rt th aff ct d joints in omfortabl pos ti whi h will p o ide for optim l physical us in the ev t th t joint mot on b ub eq ntly lost

2 In the ankylo ing f m of a thr ti aft r th ut proc

has subsided mploy careful active xercises or p ssı e mobılı a t on ea ly and regularly a tolerated ın order to prevent defo mıly and to prese ve joint motion

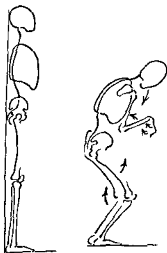
3 Avo d measures which cau e a pers tent in re se ın symp toms So called rout ne measures e g h t a e not unıf rmly tole ated by pat ents Th orr t balan e of heat massag rest and exercise must be planned for a h pat t

4 Patients w th joi t dis ase (p tıcularly rh um toıd o sup purative arth ıtıs) are in constant thre t of deform ty Guard part cularly agaınst flexion deform ties

5 The services of a spe alist in physical therapy should be ut lızed when ver possible

6 If the a thrit s ıs s vere the cour e of the d ea e seems unfavo abl or ankylos app ars in vıtable arly consult t w th a special st ıs imper tıve Special o th ped c mea res su h as man pulatıon under an sth sia t t on special casts bra es and corsets and surgical measures includ g arthropla ty c p lotomy tenotomy arthrodes and syno ectomy m y be requ d

7 Emph s e to the p t ent th ımpo t n e of c mplete o operat on and hıs espon ıbil ty with the physical therapy program at home as well as ın the office or hospital St es th imp rtanc of y ar ro nd continuan e of t eatm nt f necessary Instru t th patıent and/or h f mily nd friend as to th ex t and p oper u e of heat immobil ation and p ssive mob l ation u de hom cond ti ns



Normal Posture and the Deforming Tendencies of Joint Disease

OPTIMAL FUNCTIONAL POSITION OF JOINTS

Should ankylosis seem in vitable de pite adequate therapy or desirable early orthopedic consultation is imperative The following table gives certain commonly a cepted optimal fun t onal positions in which joints may be permitted to fus It must be emphasi ed h wever that a given position is functional for a giv n individual dep nding upon such factors as l vi g habits occupation recreation and p rsonal preferences

Joint	Po ition
Should r	Arm abducted at about 75 the elbow joint pla ed in line with th anterior hest and with partial pron t on of th forearm
Elbow	Elbow at slightly less than 90° with th f r m in a position mid way betwe n supinat on and pronation Exceptions laborers full supination le ical work rs full pronation
Wrist	Sl ght (30°) dorsifl xion
Hand	Partial flex on of fingers a d m t carpophalangeal joints and partial app sition of thumb
H p	Unilateral in l em nt Extension with minimal abduc tion and minimal lateral rotation Bilateral in olv m nt Sl ght flexion of one hip joint and th oth r as above
Knee	Act ve ind viduals Full extens on S dentary ind v d uals 35 of fl xion Young ndividuals with active epiphyses Only slight flexi n
Ankle	Foot t 90° angl with leg minimally e erted

REST IMMOBILIZATION AND SUPPORT

Spi Rest in a comf table posit on on a flat firm bed without p llow at he d s e sential A 3 x 5 ft plywood or other simple ty of bedboard plac d und a th n firm hair or felt matt ess is advisable Im mobilizat n and suppo t of the spi e by a simple well appl d adhesi e strapp ng may g ve prompt t mporary r l ef Suitable corset or back braces may be employed on ambulatory patients with mild sympt ms Special body mo ds (plast r shell) or rigid ja kets may be advised by the orthopedist for patients confin d to bed

Cer al Spin Rest in a omfo tabl pos tion on a flat firm bed without a pillow (s abo e) Immob lizat on and suppo t of head may be a complish d by special orthoped c or home made ollars The l tt may b mad simply by folding a soft bath towel tw ce lengthwi e and wrapping nugly around neck and faste ing with pins T a t n may b ne ssa y if d form ty is prese t or pain is se e e

Should R st in bed in a comfortable position on a flat f rm bed with ut a pillow (as bove) S pport the arm with pillows in a po it on of interm ediat abduction and ext rnal rotation After

pati nt is ambulatory th arm of the involved shoulder may be supported by a sl ng

Elbow Support the arm and hand (thumb and fingers free) in a mold d bivalve plaste cast with the elbow in a position of m mum tolerated e tensio This is to combat the n t ral fle ion te d ncy

Wri t Provide re t and support for th hand in a bi al e spl nt which corrects the natural deforming tendency t w st flexion nd ulnar deviation At first the splint should be worn continu sly x c pt for removal 1 or 2 times daily to permit physical the apy lat the splint need be worn only in bed

Hand A supporting plaster splint fitted into the palm and e tending to form a pocket for the parti lly flexed fingers may p eve t the natu al d fo mi g tend ncy of hyp xt n ion of the meta arp phala geal and d stal interphala geal joints a d flex n of the p oximal interphalangeal joints This spli t sho ld be remo d 2 to 3 times daily t pe mit phy ical th rapy

Hip Th p tie t should b at b d r st A detachable plaster hip sp ca may b us d to p ovide support and e t for th acut ly involved hip joint It may be wo n all n ght but it must be remo ed at l st 2 or 3 times da ly to perm t physi l the py (at le st i the case of rh um toid j ints) The patient s nstructed t l e p one i b d with 1 or 2 p llow (as n ssary) u der the abdomen t fi pel vis fo 1/2 to 1 hour 1 o 2 time d ily (The we ght of the body is utilized as a l ad aga nst the powerful fle or mus les of the th ghs) The pill ws may b removed a tole ated and a th fl xion de form ty is co r t d

Knees The pat nt sho ld in tially b at b d t We ght b aring up n the acut joi t sho ld be tricted o p ohibit d In mild and on defo m d joi t the po te o plast r pl t is o e ient to us and will uff ce It sho ld b w n almo t ontin o sly whil th pat ent is n b d p ticula ly d ri g the n ght Adj st ble pli ts with slight fl xi may be empl yed o pati t who a e able to walk Wh n joint i volvem t is mo e ma k d a d fl ion deform ity is present corr t n plast cast a pplied a posit on f maximum correction nd left o f 2 days Th ca t i bival ed a d remo ed f r physical the apy twi e a day New casts ar made to provide further correction as i d ated D r g convalesc nt or chron phase provide suppo t for th kne with el ti ba d ge posterio splint or special o thopedi b a

Ankl nd Fe t W ght bearing up n th acut ly i ol ed joi ts must be prohibit d Provide a cradl or larg pillow at the foot of the bed in order to hold the bedcloth s off the f t A uppo ting r movable plaster boot cast (with tips of to e pos d) is v luable Adjustable or rial bivalved pl te foot cast may b employed for the gradual orrection of deformiti s P ide w ll b ilt sh allowing prop r length and width for toes stability and a suitable ar h s ppo t (spong rubb r o felt pad a quit satisfa to y) Correct abnormalitie and defo mities of th hip and k e joints which produce mechanical strain on th f et

Chapter 13

TECHNICS OF MEDICAL REHABILITATION

By ehabilitation m d l reh b lit t on habil t tio f th phy ally handic pped p t t is meant the st at on of th p ti t to his maximum phys c l s cial nd o om capacity To be most ff t v it hould b t t d at the ons t of y ill ss ut o ch onic D fin t v th r py nd hab l tati n oft d ff ult to o cile in whi h ca approp iat omp om ses m t b m de in order to r d r th b t po ble e vice to the pat t

R idu l di bility is often a s d ot by the o iginal illness b t by inacti ity (g b d t o hair rest) a t ity in a f ulty po ti n be se of w akn ss o pain F ex mple fl x on on tra tu d bitu ul e s and pa f l houlde s in h m pl gia and myocard al infa t e voidable if r habilit tion is start d e ly Fu thermor th p t nt p ychologic l p e to his illn s m h mo e favorabl if h k ow th t th phy i i n g al in t eatm t go b y d the imm diat m di al p oblem t incl d to tion to us ful funct

Th t h ed in medical habilitation a e pr mar ly phy i al and educ t onal Phy i l measures c sist of po itioning spl t g b i g and x i Within the limit f h esid l ability the pat t mu t be train d to m xim m funct o w th o w th t th aid of o thop di devi es Rehab litation p ocedur s ied o t with th h lp of n rsi g t ff d th r p sts (phy ical p t al spe ch t) under th d t of the phys an In e of hom m gement of a di bled p ti nt m mb of th family m y be i str t d in eh b l tat on p ed res

PREVENTION OF DISUSE PHENOMENA

Immobilizatio in tivity of a y p t of the body l ads t ha g s whi h m y b gro p d unde th t rm dis e phenom a (e t bl on p g 328) Lack of ti ity may be ca s d by paraly sis p in limited jo t m tion (ankylos o t ture ast b) amp tat ons s ry lo s and r t i ted act v ty f medical or p y h t e ons Di phe om a l d t f th r ti ity and th by agg av tion and extensi n of disuse

The m n m r f th p e ti of dis e ph om na ar a follow

(1) P s ang of jo t motio (p ge 334 2)
(2) P op p ti g d uppo t (e pag 325)
(3) Ch g f p s tio (e p g 329) incl d g th t lt table (s p g 330)
(4) E i e (s p g 334) (S also B d E s p g 329 Stand up E i p g 331 and O c p t o l Therapy p g 334 2)

Cause and Prevention of Disuse Phenom na

	C s	P i
M a le trophy (weak)	La k of ci	E r is
Joint ont t (limit d ra ge)	La k of joint m tio	Chang f po ti passi e ra g f m tion splinting and upport
Orth a ati hypot io	La k of t positi	T lt tabl and sta d up la a
Bon at phy (te po o i and urin ry lithi si)	La k of w ght b ari g and m i p ll	T lt t bl d ta d p e i a Gen l x ci
De ub t s ul	P i g d p ss	Ch g f pos ti
V n us th mbo	Sl w d us fl w	Change f p ti P i
Hyp t ti pn monia	Lack of ch t pan io	Chang f positi E i
U inary inco tin e	U a ilabil ty f epta l at tim f voiding	U inal b d pa ded i te d of i dw lling c th te

CHANGE OF POSITION

Frequent change of position is the most important s ngle mea ure in the management of the dis bled patient Patient sus eptible to pressure sores equ re frequent shifting The time in each posi tion should b prescr bed by the phys cian n th form of a precise schedule including all therapeut c and nursing p ocedures Routine orders su h as up in hair as tole ated are ineffecti e and may v n be ha mf l For example a paraplegic who tole ates six hours sitting in a h r will dev lop bilateral ischial press re sores

The followi g s a sampl hange of position schedule which was presc ib d fo a patient w th a severe n u ologic disease (early transverse spinal cord les on) Let s as ume that because of flaccid paralysis sensory lo s h avy weight and l ck of substan tial f t padding the max mum t m f r pressure over the sacrum tro hant rs and isch a must be limit d to one half hou

Sampl Change of Position Schedule

7 00 7 30 a m B d b th
7 30 8 00 a m Ch ir (b akfa t)
8 00 9 00 a m B d (half h rt
1 t and half h l ft l t
d c bit)
9 00 9 30 a m C mm de (bow l
training)
9 30 10 30 m B d (half h
pine half hr F wl po)
10 30 11 00 m Tilt tabl
11 00 m 12 00 noon B d (p)
12 00 noon 12 30 p m Ch i
(lun h)
12 30 3 00 p m Bed (half h rt
l t d bit half h s pin
h lf h l ft lat de bit
on hr p o)
3 00 3 30 p m Tilt t bl
3 30 4 30 p m Bed (half h rt
d half h l ft l t de ubit)
4 30 5 00 p m Chai (dinn)
5 00 7 00 p m Bed (half h rt
l t d ubitus half hr Fowl s
po half h l ft lat d bi s
h lf h pi)
7 00 10 00 p m B d (p on)
10 00 11 30 p m Bed (h lf hr rt
l t d ubit s half h pi
half h l ft l t d bi)
11 30 p m 2 30 a m Bed (pro)
2 30 4 00 m B d (half h rt
l t d bit half h pi e
half h l t l dec bit s)
4 00 7 00 m Bed (pro)

In a patie t in prolo ged coma th need for change of po ition is similar but the ch ir and tilt table ha to be eliminat d in f or of the p one po ition The prone position is well tolerated by th mato patie t can b maintained f r sev ral h urs without caus i g pre su e ores and abo e all permit postural drainage of respiratory s cr tions In an elderly patient in danger of orthost tic p eum nia howe er the chai and tilt table may dominate th day chedule A chai period should not e ceed one ho r in th lde ly pati nt be au of th danger of knee nd hip fl xion cont act r s

While th comatos and sev ly paralyzed patient d pends en ti ly on the nu si g taff for his h g of position the patient with some phy ical ability hould c ry out his change of position by himself or with minor assi tance (See Exe cises below)

BED AND BED EXERCISES

To p rmit change of positi n as well a getting i a d out the b d m st have the f llowing fe ture (1) A fi m matt e s (p ef r ably two n h fo m rubber ov r a w od n board) (2) A ide r il if the p ti nt can ot tu n witho t holding o (3) An overhead frame with trap ze fo sitting up and getti g out of bed (4) A f otboa d ma nly to p v nt the she t from pre sing on the fe t In th par pl gi th feet should est again t th footboa d to prevent foot drop (5) Th h ight of th b d hould be th r tilt tabl he ght o ch ir h ight acco ding to the need of th patient (6) The b d m st be se u again t the flo r so that it doe n t sl de or oll when the pati t g t out o in o leans agai t it

B d Exe ci s

B d e r ises c mp is th e gro ps of tivity acti e chang of po ition elf c e and oc upational th rapy and sp ifi ex r ise

A A tive Change of Positio This may be ar ied out by th pa t e t unde th di ect on of the rs or the pist if n ce sary with some as i tan Exampl To tu n from supin to the right s d move the body tow d th left edge of the b d pull up the left knee each with th left a m for the right side rail and pull the body r o to the ight ide

B Self e Fe di g washing w iti g t sh uld be don by the p t ent as much as pos bl unles cont indic t d

C Sp if B d Ex ci es

1 St aight l g ai ng (B d flat p tie t supin nco red h ds on matt es o sid rails) Raise right l g to e tical position with kn e tended Low r lowly onto bed Do the me with the left leg Repeat each leg ten tim s

2 Sit ups (H ad of bed ais d to 45 o l as pati nt pin un o red mi reclining hands folded behind n k legs st aight) Raise trunk into sitting po ition R clin slowly Repe t ten times

3 Chinnings (Bed fl t pati nt pine both hands on ove head trapeze) Raise trunk by be ding elbow until shoulde s are at th le l of the t apez Low r trunk lowly Repe t ten time

CONTRAINDICATIONS When complete bed r st is n ded (se p g 1) ll bed e ise are ont aindicat d C rtain of the x rcis m y be ont aindic t d be au e of local co dition (pain

fracture etc) The amount of activity should often be gradually in creased, and the exercises prescribed must be chosen accordi gly

TILT TABLE

The tilt table is usef 1 device for the gradual establishment of we ght bearing or erect position a d for retraining in weight beari g or erect position in patients unable to stand Weight bearing helps prevent or counter cts osteoporosis in the lower extremities The erect posit on s rves as a change of pressure area p ev nts flexion contractur s develops xtensor spasticity n pper motor ne ron lesions facilitates chest e pansion and uri ary dra nage a d p e vents loss of ense of verti ality and d velopment of orthostatic hypotens on Gradual establishment of e ect positio helps over ome exist ng orthostati hypote sion The tilt tabl is contraindi ated in unconsciousness sever pain and acute illness

Tech c

A tilt table esembles a stretcl er whose top can be tilted grad ually f om a horizo tal to a verti al posit on A footb ard at the lower end prevents the pati nt from sliding down and allows weight bearing The patient may be str pped to th table top across the pelvis knees and hest as need d He should not be immob li ed more than neces ary and sl ould perform some exe cise activity dur ng the sta ding pe od The angle of tilt is determined by the desired amo nt of weight bearing and e ect pos tion It is usually between 45 and 80

In most patients for wh m the t lt table s nd cated i e p tie ts with p ralysi o who ha e be n t bed r st fo long p riods the tilted position m st be e tabl sh d g adually o er a period of d ys and w ks On e the patient s sed to the tilt t ble he may remain in the maximum t lt posit on p to one ho r two or thr e t m s da ly Tilt tabl tr atm nt s begun as follows

1 B nd ge the pat ent s lowe ext em ties tightly with elastic b dages and apply a tigl t bdominal binder (sc ltetus)
2 Plac the patient on a fl t tilt table and f sten the straps across the pelvis kn e and chest
3 *Apply a BP cuff to th arm and re ord the BP*
4 Tilt the tabl 15 and take BP ery two or thr e m n tes
   a If th pati nt fe ls faint o di y a d the BP d ops return to flat po ti n and start o er ral ng the table only 10° (If the pat ent complains of di ziness b t BP does not drop encourage him to stay p and proc ed as below)
   b If th patient fe ls all right b t the BP d op watch cl se ly After a few minut s th BP m y ris and stabili e sl ghtly b low th pat e t s no m l pressu Do not in crease tilt but maintain a 15 tilt fo 15 30 minut s If the BP conti ues to drop the patie t will soon f el dizzy and should be returned to the flat position
   c If the patient feels ll right and the BP m intains itself *for several* minutes in rea e tilt by anothe 15
5 Continue pro ed re until the patient tol r tes the desired tilt *Then gradually* eliminate bandages and abdominal bi de s

STAND-UP EXERCISES

Stand p e e cises are indi t d wh n th is a d for w ght bearing nd e e t position (see Tilt Tabl p g 330) st ngth ing of calf th gh and t nk mu cl to in a e spirat ry and circu l tory eff cy to de elop tanding bala and in prep ration for amb l tion (To be p in a ch r s of no val in prepa atio fo ambul tion unl ss combin d w th stand up exercises) The e exe cises ar ontr indicated in ac te ill e diac d omp sation and e rly myo a d l inf ctio

Techn

Th i e consists of standi g up from a chai ing the p we of th kn hip and t unk exte o The r s can b do on o e leg If th pati nt is y weak a v ry high chair m st be us d Ac d g to th h ght and str ngth of the p tient wooden bl cks six fo two i che high with a six by six in h ba e and h ll wed c nt s are pla d unde the leg f th h Th p ti t f ces th foot end of th b d and m y teady him If by holding o to th b d f me He m st w ar sho s which do n t slip on th floo A two by tw l bo d bra ed g inst the legs of the bed is u ef l in tabili i g the pat nt foot Th p ti n of the w ight b i g l g s s h that th heel lines up with th fr t l gs of th cha The umber and sp d f t nd p d pe d upon the indi vidual p t nt Two to ix ion a d y a e u ally pr s b d best at the b g nni g and/o at th nd of th h i pe i d An v g p escr ption is t n tand up pe e ion t the rat of two p r min t

REHABILITATION OF THE HEMIPLEGIC PATIENT

Advan i phys cal m di i h e gi n w hop to the p ti nt wh suff s f m h mipleg a a diti n which is ounte ed mor a d m in clin cal m dici The followi g p gram is in t d d to ser nly guide it appl s to th typ cal cas f er bral l accide t b t th p i ciples ar th me in h miplegia of a y tiol gy

B d Ph

St ts on o d or th d d y f illness o as oon a the patie t is on s Th patient s bed sho ld b f h i h ight and h uld h e sid ra ls and an ov rh ad t pe e

A E is Start w th t minut s of i e e ery two h and inc s to 30 m nut of x i e e y tw ho s
   1 With good arm a d leg turn from b k to ide to abd me then to oth ide a d th n b k Repeat in ppo ite dir t o
   2 W th good h nd o t pe e pull t s tt ng po ition and back
   3 M e sid w y pw rds and d wnw ds in b d
   4 Sit p on edge of bed with ide rail moved legs da gling and m e along dg of b d with aid of good a m a d l g

B S lf C (all d with g od hand)
   1 T ilet activities Wash f a d h ds comb hai sh ve
   2 Fe ding ti iti s At fi t in b d with b ck oll d p l t r itting o edg of bed

C B i g N d g bed ph s

Standing Phase

Starts three to f ve days after beginning bed phase replaces bed phase as soon as po sible Patient is placed in a mchair with h s good side next to the foot of the bed the vertical bar of the overhead frame in reach of his good hand and the paralyzed arm in a sling

A Exer ise (See also page 331) Start with ten minutes of exer cise every two hours and increase to 30 minutes every two hours
 1 Ra se to standing position on good leg Sit back
 2 Standing with good hand on vertical bar of overh ad frame perform slight knee bend and straigt ten up Repeat with grad ally d eper knee b nds
 3 Stand with good hand on verti al bar of bed frame Go up on toes come back down

B Self Care (using good hand)
 1 Toilet a tivities Complete bath in bed
 2 Dressing activities Dress and undr ss except for shoes

C Bra ing
 1 Fl t wooden splint (attached to vol r surfa e with ace band age o straps) from one inch below th elbow to one half inch beyond the fingertips of the paralyzed arm
 2 Keep paralyz d arm in sling to prevent pull on shoulder
 3 If after two w eks the paralyzed leg still rem ins completely flail a long leg brace is needed in order to continue r hab l itatio

Stair climbi g Phase

Starts two to ten days after the b ginni g of th standing phase and should repla e standing phase as oo as pos ible

A E rc se Performed fou times a day incr sing from s veral steps to a whole flight of stairs The pat ent is placed in a chair facing the foot of a flight of stairs the good arm next to the ban ster The paralyzed a m is splinted and n a sling and the paralyzed leg is in a long leg brace if need d
 1 Pull to standing posit on holding to the banist r with the good hand step up o e st p with the good leg th n p ll para lyzed leg up to the same step Contin e for several steps
 2 St p ba kward and down with the p alyzed leg and put the good leg down ext to it Co tin f r se er l teps
 3 Whil everal sta rs up turn toward a d reach o er to the opposite b n ste Step f rward and d w w th the pa aly ed leg Then place good leg n t to paralyz d leg nd contin e

B Self C re Compl te toilet and feeding and dres ing activities should be po sibl by this tim

C B aci g
 1 Long l g br c if indi at d (ee Sta ding Phase)
 2 If patient has a foot drop du ng stair climbing h should h ve a short leg brace with a 90 post rior stop at ankle
 3 If the patient show evidence of inversion or ev r io of the foot he should have a short l g brace w th a T st ap
 4 If function has returned to the paralyzed h nd the splint may be discarded Otherwise it should be worn i te mitte tly

Ca e walking Pha e

Starts as soon as the patient is c pable of walking up and d wn a whole flight of stairs witho t tiring P r lyz d arm is kept in sling and cane is held with good hand Two differ ite al g a

cane are ecommended for th hemipl gic patient

A Sl w G t (F r fearful p tients or patients with poo balance) Move cane forward, place good foot next to cane and then d ag p ralyzed foot next to good foot

B F t G it Standing on g od leg place cane nd par lyzed leg f rward simultan ously and put we ght on them Swing good leg thr ugh in front of cane and p alyzed leg and put w ight on it Contin e in th s fash on

Special Probl ms in H miplegic Pati nts

A Ca of th Pa alyz d Upp Ext mity

1 Compl te ab nce of f ction In mo t case no useful func tion et rn to the pa alyz d upp r extremity and the wri t and hand a b st upported in the plint The sli g m y b dis ard d later whe th shoulde muscles becom spastic and the patient feels limited by th sl ng With his good hand the pati nt should mo e the par lyzed fi ge s wri t and elbow th gh the full range of motion twice a d y I ord r to move the p alyzed shoulde th ough the full range of mot on th pat nt m y need a o d th o gh an o rh ad p l ley by m ans of whi h th p ralyzed arm (ti d at th wrist) an be pulled up a high as po sibl with th good arm

2 P tial fu ti n If only pa tial function returns to th p ra lyzed extremity th pat ent sh uld use it o ly t the ext nt to whi h it is h lpful o e p di nt For oth r tiviti s th p tie t hould be tr ined in the u of th good ext emity

3 Compl te f n tio If mplet functio ret rn the patient sh ld th extremity as much as possible

B T tme t of Apha If aph sia occurs pe ch the apy (d ily in h if h peri d) should be start d a soon as po sibl If sen ory or cepti aphas s p esent th abo p ogram may b r nde ed e tremely diffi lt sin lt is b sed on the ability of the patient to und r tand wh t s r q ired of him

C C re f H m a op ia (minor probl m) If h mi nopsia is pre t the pat ent sh uld be train d to tu n his he d to the h mi nop i sid in ord r to bring hi vis al f ld in f ont of him L ter me adju tm nt in the visual field occu s

D C re of Sphi ct rs Some hemiplegics are incontine t in the arly ph a A indwelling ath ter is rar ly ne ssa y The patie t should be remi ded to empty his bladd r voluntarily at hou ly int r als The e int val can be g adually incr as d

E O ganic Me tal Syndrome Whe thi is p es t the whole re habil tatio prog am b come diffi ult The p ti nt may ith r t und stand or may be unabl to once trat The c nfu ion may be pr sent at on tim a d ab t at an ti e and ad ant g should be tak n of the patient s l cid pe iods O gani mental syndrome oc rs ually in p tie ts who ha e had s er l strok s Th pati nt mental tate sually impro es onsid r ably du ing an a ti e ehabilitation p og m

REHABILITATION THERAPY

Physi al Th apy

Fhy i al th apy can be d fin d as a method of tre tm nt a d pre e tion of mu ulo k letal dis rd rs by the use of light

electric ty cold heat exercise and passive mobilization The latter three are used most commonly

A Heat Heat ther py is indicated in acute and co valescent dis eases of the joint muscles fasc ae tendons and bursa to relieve pain and to red ce muscle spasm and for chronic in volvement of these areas to reli ve pain reduce muscle spasm hasten recovery and to serve as an adjunct or prepa ration for other physical therapy methods It is contraindi at d in local diseases of the skin peripheral vascular disease (as cular insufficie cy see page 207) and in patients w th los of sensation

Technic Pl ce the part to be treated in a coml rtable and relaxed position Begin slowly and cautio sly Tr at for sho t periods not longer than 15 to 20 m nutes initially When the skin is pink and moist discontinue Start with low r temper atures adjusted to patient s tolerance Grad ally i crea time and temperat re as tolerated and indicated (average time is 30 minutes) Avoid drafts Following treatments provide protective overing for 20 to 30 minutes to avoid chilling

There is no vidence that any of the specific methods gi n below h ve more therapeutic value than oth rs or are p eferable in certain condit ons although they differ in penetration

1 Co d ctive he t (di ct contact) Hot water bottle or electric heating pad Mo st he t can be administered to l c l area as hot compresses (hot packs) soaks or whirlpool or paraffin baths Tub baths and the Hubb d tank permit sub mersion of the whole body and simultaneous admi istration of stretching a d exe se (se below)
2 Radia t heat Electric b lbs or infra red lamps A baker s a la g refle ting hood with se eral bulbs
3 Conversive heat Heat may be developed by the resistan e of tissu s to the p ssage of high freq ency wave or ultra sonic vibratio s Treatm nt of th s sort may be more effec tive than othe forms of h at t e tment in certain patie ts with involvement of th spine and large joints It is contra indicated in late pr gnan y and in patient with malignan y Long wave diathe my short wave di the my mi roth rm (adar w ve lengths) and ultraso nd equipme t a e sed for this purpose and certain po nts des rve onsid r t on
   a Special equ pm nt i q ired nd treatme ts must be administered by a t a d ope ato Ne er p rmit self treatme t with diath rmy by a patient at home
   b Rarely esse ti l s nce othe simpl methods are usually eq ally effe t ve
   c No specific ther peuti effe ts othe than heating action

B Ex rcise

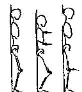
1 Therap utic exercis is a vol ntary tive m tion of p rt o all of th body desig ed to p od ce improvem nt of function
   a Assist d e er ise Voluntary moveme t by th patie t directed and assisted by the therapist
   b Indep ndent x rcise Voluntary moveme t unde dir c tion but without assi ta ce
   c Resistive exe cise Voluntary mov ment against graded loads o resistance as the final t p in th rape ti e r cise Specific remed al e e ci s and occupational the apy represent a more advan d type of esistive ex rcise

2 Specifi planned rem d al ercises A g eat m ny sp cific functional ercis a h b desig d to c rect abno mal it s f joint functio and m l we kne s Th ario s home m d imp vis tions a d r dy m de d may b cell t but m st lw y be mod f d to m t ind vidual eed S me of the common and well ac pt d cises in lud (1) weight nd pulley x f r elbow and hould gi dl jo t ( ) ha d ercises (sq ing rubber b ll or spo ge or ha d p ing) o f st making e r i s (m y b p formed u d w ter in b sin aks) (3) d rwat r ex s (po l o H bb d ta k) fo pin and g dl pp r nd low xtremiti (4) parall l b (upport d v ces to p m t w ght b ing) f upp o low r e t m ty joints d (5) post l ex s P tur l x ses are ca d ut as f llow

bitti g S t hair nd m intain tall t possibl po tion f 2 5 minut s

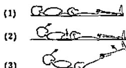
b Sta di g (see b low)
(1) St d ag inst w ll w th k ees p t lly fl x d
(2) R l x th erv c l a d lumb r p t f the spin a d p th pine g t the w ll
(3) Gr d ally tr ight kn es

(1) ( ) (3)



Standing

(1)
(2)
(3)



Lying Down

Lying dow (e b)
(1) L b k
(2) Pl chi o ch t d op l mbar spin a d k ees to floo
(3) Ra s p lvis l gs and hest s m ltaneo sly

d W lki g
(1) Walk w th w ght ev ly d trib t d a d feet po t d st aight ahe d
(2) R ll th h ps d by t cti g b tt k d w nd bd min l muscl p th by t lting th p l b k d t aight ing the l mb p e
(3) R is th ch st p the eby la g g the thora vity and r g th d aph agm
(4) St tch th b k p t of th t p f the he d t ward th ling th s t ight s th rvi l and d al sp
(5) S t t d d walk t ll po ble

C Passive Mobil zation The principal types of passive motion exercises are descr bed below *Stret hing and ra ge of motion* exercises may be prescribed as often as every 2 hours Mas sage is usually given o ce a day manipulation not ofte er than once or twice a week The minimum of therapy depends upon the patient s condition Pass ve motion and stretching should be repeated several times for each joint If only one joint is in volved the procedure will last only 2 to 3 min tes If se eral are treated it will last longer but should n t exceed 15 minutes If all joints cannot be treated in one session the number of treatments should be increased and the joints alternated

1 Passive motion of joint through the existing range This is done by a physi al therapist or other person or by the patient himself The movement is slow it should cover the complete available range and be repeated seve al times No force should be used and the patient should be r laxed The objec tive is to prevent loss of range of motion particularly in pa ti nts immobiliz d by spli ts sli gs sandb g etc
2 Stretching Similar to pass ve motion and somewhat force ful it is ca r ed slightly beyo d the existing ra g Th s proc du e may cause a c rtain amount of pain and should be p eceded by analges cs Stretching should be perf rmed only by a physical therapist I d atio In def rming types of arthr tis stretching is used to dec ease flexion contractures In osteoarthritis and fibro it s it may actually lead to cure by giving complete pain relief In postur correction stretchi g i an adjunct to active exercises
3 Manipulation A passive rathe fo ceful and s dden mobili zation of joint in a direction which is ot used physiologic ally e g sideward motion or rotation in a met ca popha langeal joint Manipulation should be do e only by a phys cian prefer bly with ut anesthesia It is used to break up painful intra articular adhesio s It may also be sed in stead of stretching It has the ad antage that the mobilizatio annot be ounteracted by voluntary ontraction or spasm be cause of the dir ction of the pull
4 Massage (minor physiological valu) Essentially a mobili z tion of soft tis u by di e t man l or digital a tio

OCCUPATIONAL THERAPY

Occupational the apy is defined s a medically p escribed acti ity with the emph sis on p poseful ct vities Thes include (1) self c e traini g (e g feedi g washing d essing) (2) recrea tional activit es (e g weaving wood arving needle wo k paint ing) and (3) prevocati nal a tivities (e g typing business machine operation machine hop w k)

SPEECH THERAPY

Speech therapy is the medically prescribed co rection of spe ch disturbances r sulting from (1) psy hiatric c es (e g st ttering) (2) ne rological caus s (e g aphasi vo al cord pa aly is) r (3) otolaryngological causes (e g cl ft palate d fn s)

Chapter 14

DISEASES OF THE NERVOUS SYSTEM

DISORDERS OF CONSCIOUSNESS

D stu banc s f the e or um m y b associ t d w th d a ed m t a t vity (e g st p o ma) or n sed mot a t v ty (e g c tem nt deli m man) S so i l d turban may ang f om p rt al l uding t c mpl t obl t ation of on c ou ness Th p tt n of rea t f th d so d dep nd upon th natur and int n ty of th timulus d th phys l ment l nd m t onal st tu f th ind v d l S m of th a s t factor e t aum brov ul a id nts dr g into at on p ings f m t b l di o d r m ning ti o whelmi g infection onvul v di ord r and card ac de mp at

STUPOR (code No 933) and COMA (code No 932)

Stup g from p t l to alm st mpl t lo s of n cio s ness C m i compl t uncons n ss f om wh h th pat t nn t b arous d v n by th m t p inful tim li

D gn i

A H t y I t og te pat nt during l id t v ls Val ble nfo m ti may lso b obtain d f om th p t nts f ds lativ s a d attendants Inqui p c f lly ab t th pa t nt p t n p vi phys l m tal r em t onal illness d ab t trauma l oh l d g pilepsy o hyp ten on

B Phys l E min ti Pla p tic l emph sis n v t l igns d n e f inj y o int x tio and n logi l ab mal itie D n t um o i l d turban s d to al h l m r ly b e an lc h l b th i det t d

C L b t y P ed

1 C th t th p t t if nec s ry and ex min u ine p i lly fo lb m blood ug a d acet e
2 T k Hgb WBC d ff ti l u t and h m to it
3 D w bl od f N P N gl e d bl d mm nia wh n ind ted (fo di gn i of emia d abetic oma d h p t om)
4 Lumba pun t r ho ld b on id d f ll om tos p t t unl s ther e sp if co t aind catio s (g u p t d p te o foss les o)
5 Sp ial tud m y be indicated g blo d c lt s a d analys s f body fl id fo v d of t x ns
6 Skull y wh n indic ted

Treatment

A Emergency Measu es *Maintain life until specific diag nosis is made and treatment administered*

1 Maintain adequate respiration First determine the ca se of any respiratory difficulty (e g obstruction pulmonary dis ease depression of respiratory center vascular collapse)

a *Keep airways open* Pl e patient on his s de or ab domen with face to the side and head well extended (NEVER on his back or with head flexed) If necessary pull tongue forward with f ngers or forceps and maintain in an extended position (e g by pharyngeal airway) Asp rate mucus blood and saliva from the mouth and nose with a lubricated soft rubb r catheter If no su tio apparatus is avail ble use a 25 50 cc syringe Endo tracheal catheteriz t on or tracheo tomy may be neces sary (CAUTION Do not allow ndotracheal tube to r main for mor than 2 hou s because f danger of laryn geal edema and further obstruct on upon its removal) The services of a trained anesthesiologist or ot laryn g logist are d s ble for this

b Artificial respiration may be administered if re piratio s have eased or a e f iling (see p ge 150)

c Oxygen m y be administer d by mask cath ter or tent as indicated (s e p ge 138)

2 *SHOCK* Institute immedi te treatment if patient is in shock or may suffer shock (see p g 27)

B Ge eral Meas res

1 Constant ob v tion of the pat ent must be ma nt ined

2 Unless ontr indicated place in shock posit on (s e page 2) and change body posit ons every $1/2$ 1 ho r t prev nt hypostatic pneumonia and skin ulcerat ons

3 Cath t r z pat nt if oma pers sts for longer than 8 to 12 hours and patie t fails to void If ne es y insert an i dwelling catheter Us t ile technic

4 Nutrition and hydr t n Provide prop r fl id and n trit on by I V gl o amino a ids and sal n solutions (s e pag 20) fo the fir t few days unt l the pat nt is ble to take fluids by mouth If the pat nt s om t se f mo e than 2 3 days tube feedings must b employed (see page 59)

5 Sedation

a Wh n ver possible avo d s dat o o ther medi ation until a specific diagnosis has b n made

b Sed tion with paraldehyde or barbiturat s may be ne es sary for mild re tle sness in those cases not d to bar b turat or other d g toxi ity

C Specific Mea res T at sp c fi se su h a f v rs i f ctions t xin (se p cific diseases)

DELIRIUM (code No 931) and MANIA (code No 037)

Del rium is char cte ized by mental d st bances (g ill sions delus ons and hall cin tions) physi al x it m t with r st lessness a d lack of coher nce

Mania is often temporary har cteri d by wild o e tivity and at times by illusions delusions and hallu in tory trend

Th se two onditions are di us d tog th r be ause they hare many points in mmon The p incipal th rapeuti diffe nce l es in the cho ce of sed ti e and hypnoti medicat ons Altho gh most sedative and hypnotic dr g in proper dosage may be u d with rela ti impunity in mani the numbe of d gs which can be employed in d l ri m i l m t d Chloral hyd at i contr ind cat d in ac t al holi delirium (For d agnosis s Com p 335)

T atm t

A P ot ct From Physi al I jury

1 Quarter U s fest oom ava lable prefe ably on lowest floor of building

2 Windows Scr en b r or otherwi e prot ct windows Locked he vy scr ens are most de rable

3 Furnitu R m ve ll furnitu e and fu nishing from the room e cept a low b d a bed w th sid board or at times simply a matt ess on the floor Th ro m must b fre of sharp obj ct

4 *Avoid* m hanical e t aints wh never possibl e c pt for spec fi medical or surgical reaso s Use chemical re traint o use hydrothe apy as m nti n d lat r *Observe for suicidal or destructive tendencies*

B R ss e P t ent

1 Be kindly nd understanding Re gni patient s a t ons as those of a nfused and si k p rson

2 Lighting and noises S e that the oom is ad qu tely light d both d y and night and free from sh dow Unu u l noi sho ld be void d b t familiar unds may actually s ve to es u e the pati nt Rem mbe that th p t ent may b onf sed and will mi interp et trang se sory timuli

3 Help th patient to und tand what is h ppening and why he s in hi p ticular tuation Do n t mi pre nt Ex plain d agno t c and th rap ti p oced s when ce ary

4 Relativ s and fri nd Recru t aid f p ti nt lativ s and f iends inc a famili figu es they may s v to l sen th pati nt app eh n on Howev p y hiat i pa tients frequently bec m di turbed unde th se ircum tance

5 Constant nu s g att d n is n y

C S d tiv d Hypn t c Drug Tranq li

1 Chlorp om in Hyd ochlo de U S P (Tho a in ®)

a In acut ly agitat d or di turbed pat e ts hlorp omazine may be used effe ti ely to rel ve agit tion Th initial d se is 25 50 mg (3/8 3/4 gr) by deep I M injecti n S b quent inje t on may be r qu ed at intervals of 4 to 6 hou s In l s acutely distu bed patients gi e o al hl proma ine 25 mg (3/8 gr) t i d in r ase if ne es ry to 100 400 mg (1 1/2 6 gr) d ily

b Toxi ity Jaund e is oted oc s onally (about 1 5%) b t is sibl n withdrawi g the drug Amphetamine If t may be r qui ed t o rc m drow ine

2 Re e pi N N D (R se po d® Serp l®) Eff ctive in eve ly di t bed p t ts

a Giv 2 5 5 mg (1/24 1/12 g) I M and tart o l m di c tion 1 mg (1/60 g) b i d Inje tion may h e to be pe t d d ily o every th r day for 1 2 w ks Main tain do age of 1 2 mg daily th reafter

b Toxic reactions include moderat to severe depres ion (usually reversible on withdrawal of the dr g) nasal con gestion agranulocytosi and leth rgy

3 Tranquilizing drugs r cently introduced include
   a Meprobamate N N D (Miltown® Equanil®) For oral use only a erage dose 0 4 0 8 Gm (6 12 gr) q i d
   b Promazine Hydrochloride N N D (parine®) Su table for intramuscular or intravenous use initial dose 50 150 mg (3/4 2 1/4 gr) d pending on degree of excitat on Th reafter intramuscular or o al doses of 25 100 mg (1/4 1 1/4 gr) q i d
   c Prochlorpe a ine N N D (Compazine®) For oral use in doses of 5 10 mg (1/12 1/6 gr) t i d
   d Perphenazine (Trilafon®) For oral use st rt ng with 2 4 mg (1/30 1/15 gr) t i d Average daily dose 32 mg (1/2 gr) W th highe doses extrapyramidal symptoms may occur

4 Paraldehyd U S P is usef l n delir m Barbitu ates b omides and opi tes often increase the excitement of d lirium but may b used in maniacal st tes (see below) The ord nary stock paraldehyde solution needs no steril zatio and for that r ason is availabl for immediate administra tion by any desired route The oral route is preferred un less the pati nt is nable to swallow For details of adm n istrat on see page 40

5 Chl ral Hydrate U S P may be given instead of paralde hyde in dose of 2 8 cc (1/2 2 dr) of the 25% stock solution o as apsul s 0 5 2 Gm (7 1/2 30 g) orally It is co traindi ated in acute alcoholi delirium or psychosis

6 Ba biturates *not to be used for delirium* Obser e for re p ratory d pressi n a d ma ntai adequate irway
   a Thiopental odi m U S P Thiopenton Sodium B P (*Pentothal Sodium®*) *First inject 3 cc of a fr shly* prepa ed 5% olution slowly I V observe then gi e additi nal dosage a n eded for des red ffect
   b Amobarbital Sodi m U S P (Amytal Sodium®) 0 125 0 5 Gm (2 7 1/2 gr) as fre hly prepa ed 10% solution slowly I V to po nt of desi ed effect

7 Morph ne Sulfate U S P 8 15 mg (1/8 1/4 gr) with S opolamine Hydr brom d U S P 0 3 0 4 mg (1/210 1/160 gr) m y be administ red beut when delir um is marked or is a s ci t d with r aused by pain

8 Scopolamine Hyd obromide U S P For deli ium *without pain* scopolamine 0 3 0 4 mg (1/210 1/160 gr) b i d q i d may be v luable

D Hyd oth rapy
   1 A war n t b bath (92 97 F) or o alled neutral bath for half hour periods t i d or q i d m y be t ied o suit ble pati nts this may be of n id rabl al This m thod should be tri d p io to inten i dr g th apy wh n r pos s ble If it is tolerated w ll a d e ults a e effective the pati nt may remain in the t b for h urs Hyd othe apy is not applicable for certai unmanageable p ti nts for p tients with infectious or f brile dise se o for patie t with surgical dr s ings

2 Wet pa k Th s eff cti techn c should be admini t red only by trai d pe son el Th p t ent r qui s c stant supervisi n The method is ontr indi ted i pat nt who a pl ysi ally w k o xh sted re ha ing co vulsions o who have s gnif cant c d o a c l dis se V tal ign m st b ob e v d at least at i tervals of 15 20 min t s

F N tr ti n a d Hyd at on Unles the is pec f c indicat on fo hypohyd t on a ormal stat of hydr t o sho ld be mai tained This is e p ially tru in the p ne of f r Fo d li m trem s of lcoh l sm 1 2 l t rs (1 2 qt) of 5 10% glu s l t on ontaini g 100 mg (1½ g) of Thiamine Hydrochl ride U S P Aneu ine Hydro hlo de B P d 100 mg Nic ti A d U S P should b g n d ily Prop e ut iti ho ld be m tai ed Sm ll fr q nt fe di gs are be t t le t d

F P y hi t i Ca If ordinary m as s as m ntion d above do not uff c ons d r transfer t psych atr hosp tal E al u t f asibil ty of eff cting tl e t ansfe and if d ided upon p ovide for adequate tt ndant

HEAD INJURIES

Proper manag ment f th pat nt w th a h ad injury est in gre t m su upon ur log al and s rgic l diagnost c and t e t me t methods

Di gno

C f l initial e amination and l ob e v tion of the patie t in th imm d ate p t tr umati p od a e ssential

A Sign and Sympt m

1 Alte at in th tate f on cio sness i the mmed ate pe iod afte the head injury

A l id interv l follow d by ma may indicat c r br l omp es ion by ubdural o pidural h m hag If pro gr ssively d ep ning m o r aft r a pe i d of c sciou es foll wi g a h d injury e plorato y t ephin t on is indicated t rule out ubdural r p d ral hem rrhag

2 Progr ss ve foc l signs m y ind ate a dural hemorrhag

a Ipsilat l pupil i usually dilated

b C t late l hemip si m y oc u ip il t ral h mi paresi may al o occur arely

3 If th p ti t em in uncon ciou d gnosi f a pr gres iv intr anial hem rhagi l s on is difficult

V tal ign (pul e t r pi tions blood p s re) m y hang although th s a not reliabl signs

b In a of deep ing or unu u lly p olong d coma x pi atory t phin tion i indi ated

P lo g d on ious s is beli d to indi ate dam g to the b ain t m

B Labo t y Fi di g

1 Lumb punctur i advis ble t establi h th p nce of ub a hnoid hem hag a d to gi b lin app aran and p e sur of th brospinal fluid

2 Sk ll ay hould b take as soo th p ti nt s cond tion pe mits

a Presen e site and natu e of fractu s may be described
b Presence of pineal shift can be ascertained
3 Electroencephalography may assist diagnosis and progn sis in selected cases in th chronic phas Cerebral angi ography may h lp demonstrate subd ral or nt ac r bral hematoma

Treatm nt

A Emergency Measures

1 Treat shock if p e ent parenterally admin ste ed fl ids and/or blood may be required (see page 29)
2 Attention to the respiratory tra t is important maintena ce of adeq ate airway and pulmonary ventilation is vital
  a Patient should be placed in prone posit on with head turned to one side to facilitate drainage of se retions from mouth and to keep the tongu from obstructing the pharynx
  b Intratracheal intubation or tracheostomy may be ecessary to maintain op en airway
  c Give oxygen if nece sary (see pag 144)

B G n al Mea ur

1 Qui ting patient During acute or initial phas s re tless n ss may be a disturbing facto
  a Special nursing care and pa aldehyde m y be r q ir d
  b Avoid morphine be ause of medullary depress nt effects
  c Catheteri ation of a full bladder may meliorate restless ness
  d Lumbar puncture w th remov l of small amount of bloody c rebrospin l fl id may also relieve gitated pati nt
2 Antibiotic t eatment is always in tituted in the pr sence of bl ed ng or dis harge from nose or ears Giv Proc in Penicillin (U S P 600 000 un ts b i d o broad spectr m antibiotic until da g r f inf cti n s p st

VASODEPRESSOR SYNCOPE
(Vasovagal Syncope Simple Fainting Benign Faint)

This s usually ch racteriz d by a sudden fall in blood pr ssu e and a slowing of the h art The ca sat v st muli may be sensory (e g sudden pain) or entir ly emotional (e g de th of a lo ed one) Th pati nt is usu lly upright when the fai t occurs r cum b ncy rapidly restores con iou ess

Treatm nt

Patient should be placed in the recumbent position and h ad lower d Simple inhalation of fumes of Arom tic Spirits of Ammonia U S P B P may be t ied if n ce sary

ORTHOSTATIC HYPOTENSION
(Postural Hypotension) (code No 460 x10)

This is a rare caus of syncop and occurs as the pati nt assumes an upright position It is a so iat d with a ma ked d op in blood pressure on arising

Tr tm nt

Treatm nt is dire ted towards the underlying cause when po s ble If abdominal ptosis is present an abdom nal belt may pre v nt splanchnic pooling of blood Elast stockings may be of valu Vasoconstrictor drugs may be tr ed but are usually without benefit.

CAROTID SINUS SYNCOPE (code No 408 584 x)

Ther is usually a history of fainting asso iated with spells of dizzin ss betw n atta ks A definite relation to sudden turning of raising of head or w aring of a tight collar may be li ited The diagn sis s suggested by reproducing atta k by firm pr ure and massage over th arotid sinus for 10 to 20 s conds *Stimulate only one carotid sinus at a time Caution must be exerc ed in stimulating the sinuses in elderly patients Cerebrovascular accidents have been precipitated by this maneuver* Thr e types of carot d s nus syn ope are known to occur

V g l Typ

This is th m st omm n type and s most frequent in older per sons Carot d sinu pr ssur slow the heart rate This r spons can be abolished by th injection of Atropin Sulfate U S P B P 1 mg (1/60 gr) I V

Va omotor Type

O curs more frequ ntly in young r individuals Carot d s nu p ssu causes a fall in blood pr ssu this an be bolish d by inj tion 1 0 5 cc (8 m) of 1 1000 Epinephrine U S P Adrenaline B P but is unaff t d by atropine sulfat

C bral Typ

Carot d inus pre ure aff cts n ith r heart ate n r blood pres ure and neither epinephrine no atropine ulfat affe ts th refl x A direct bral eff t i postulated

Tr tm nt

C rrect all abnormalities when v r poss ble Eliminat motional problems and forbid us of t ght ollars In sev re as denerv tion f the sinuse m y be n ce ary Local an sthe ia of the carotid sinuse ab lishe all type of arotid sinus syncop

A V gal Type Atropine Sulfat U S P B P 0 4 0 6 mg (1/150 1/100 gr) 3 4 times d ily (or mo f n d d) w ll u ually abolish att ks Ephed ine Sulfate U S P o Hyd o hlorid N F 25 mg (3/8 g) with Ph ob rbital U S P 15 mg (1/4 gr) 3 4 tim s d ily o Amph t m ne S lfat U S P 5 10 mg (1/12 1/6 gr) m y b u d

B V somotor Type Ephedrine and phenoba b t l s abo e w ll u ually pre nt attack

C C r br l Type Drug are of no value

SYNCOPE DUE TO CARDIOVASCULAR DISORDERS

This type f syncope is due to rebral anoxia, which sults fr m a ... fall in ard c output Some f the u s ar

Stok s Adams syndrome onset of p roxysmal tachycardia myocardial infarction and pulmonary embolism This may be associated with certain other types of heart disease (e g aortic stenosis and tetralogy of Fallot)

Treatment
Treat the underlying abnormality

SYNCOPE DUE TO METABOLIC DISTURBANCES

Hypoglycemia may cause syncope or coma If prolonged or recurrent treatmert is required (see page 410)

Hypervent lation if severe and prolong d produces respiratory alkalosis with *resulting tetany and syncope*

Treatment
Consciousness can be re tored by rebreathing into a paper bag holding breath or administr tion of carbon dioxide 5 10% w th oxygen by mask If att cks are recurrent psychoth rapy sho ld be considered

VERTIGO

Th t rm vert go s gene ally us d to d note the s bjective sen sat on of otatory mo ment either of the indi idual o his en iron me t Di ziness impl e an in b lity to o ie t th body i r lation to surrounding objects Howeve the terms are ge erally mployed as synonyms Vert go is fo nd p ima ily in dis a e proces es in volvi g th laby inth the vestibular port on of the 8th cra ial nerve and their nu lei or connectio s True ve tigo is sually m nifested by nystagmu falling to one side a d abnormal action to tests of vestibular fu ct on Among the more c mmon auses are

1 Meniere s syndrome (see page 357)
2 Ac te labyrinth t s (ee pag 357)
3 Orga i brain dam ge nvolvi g the vestibula er e its end organs o connect ons or the cerebell m
4 D ug and toxins (e g st ptomy in see page 507)

T eatment
Treat the underlyi g diso d r

HEADACHE
(code No 961)

Headache may be due to many factors and must alw ys be r og nized as a symptom Th und rlying ause must b d t rmined and treated *in order* to effectiv ly relieve the symptom The subjecti e sensation of head che ind cates in olv ment of th p in se itiv structures *within* and *about* the skull H ada h s may b cl sified as f llows with some *of the more* common caus s listed

A Mening al *(and Allied Str tur l)* I vol m t This is du to s ac o upy ng l s ons meningitis inc a ranial

p ssure a d d s d intracranial p ssure (following lumbar pun tu)

B V ul l vol em nt

1 I t ranial va dil tat on Due to feve c t in drug and toxins (e g al hol and hi tami) psis or motion l fa tor

2 Ext acranial va odilat t on (particularly f th xt rnal carotid) M gr ine is th p incipal example

3 Di eas of the blood v s els (e g t mporal arteriti)

C M s uloskeletal In ol m t

1 M s le sp m of v rying degre s D e to myo ti adj t thritis or o teiti

2 Muscle ten on du to emot onal f tor

3 B ne o joint in olvement of k ll h ad or cervical v rt b Due t arth itis o teitis o te my lit s or t mor

D Ne v l l m t N uralgias (e g t ig min l n uralgia)

E M ll o Ext ac l In l me t Due t dise and disorde of th yes ears nose pharynx t th tc

F Emot on l I v lv m t, H adache du t emotional d sord are u ually a t d with m scle te i n (e b ve) b t th s is t lways the case At times th h adache may be du t intracranial va d l t tio

D gno is

Th d gnosis must be ba d on a ompl te history and phy i l xaminat on Sp c al att ntion t the ey s and n is im portant A mpl t blood count urin lysis and blood test f yphilis must be pe f med In m ny case an ad qu te p y h at e amin t o s also ind cated Skull y and l t o ncephalo g ms are u eful

Th pain f m ningeal involvem t i d ep a d is u ually th m st e P in f s ul igin is u ally throbbing in ch a ter pain of neuralgia has a burning qu lity He da h s of psy ho g i gin a p f ial and r man f st d by d ll tightness o p es u e

Ge l Non pe ifi T tm t M s

A Phy al and m t l st

B Sed ti es should be used only as a t mp ary m ur and sh uld not be u d as a subst tute f a complete w k p and sp ifi th py Na c t are g lly ont aind cated ex cept in terminal d s ase

C An lg i s on t tut sp if th py in f b il h d hes due t thei antipyretic ctivity They should not be admini t d for p long d p od ind min t ly th ir r tine u e ften ob cu s imp rtant p th l gy

HEADACHES DUE TO MENINGEAL INVOLVEMENT

Th e the m t e e e but th y usu lly e p d to an l g i Manif stat ons d p nd upon type and site f und lying p th logy

T tm t

A Sp ifi M Tr t th ti e lesion

B G neral Measu es
1 Analg ics should be given as n eded if pain is not too severe (see page 32)
2 Narcoti s may be n cessary if pain is v ry severe (see pag 33)
3 Lumbar puncture performed v ry cautiously may som times be used to relieve headach associated with increased intra cranial pressu e (e g subarachnoid hemorrhag hyper tension nephr tis not in poster or f sa tumors)

C Lumbar Pun ture H adache These are believed to be due to l akag of the erebrospinal fluid from the puncture site
1 Analges s If headache s mild upo ising analg s s ch a Acetyls licylic A id U S P (p rin) 0 3 Gm (g) q ? 3 hou may ffice Cod i may b ces ry
2 R cumbent position If lumbar puncture headache v ry sev re it can be alleviated by lying down
3 Intrath al inject on of small quantit s of teril no m l s line may afford el ef in seve e a es

HEADACHES DUE TO VASCULAR INVOLVEMENT

These headaches are usually throbbing in har ct r Intra cran al vasod latation usually causes bilateral pain but m graine an extracranial type is usually unilat ral Compr ss on of the common a ot d may r liev b th typ s of h da he migraine m y also be relieved by compr ssion of the external carotid artery

T atment
A I t an al Vasod l tation These ar us ally eadily r lieved by simpl analgesics s h as Acetyl li yl A id U S P (asp n) 0 3 0 6 Gm (5 10 g) ery 2 3 ho s
B Migrain (cod No 930 x40) Extracranial v sodilatat on (be l v d t b involv m nt of external arot d or it branch s)
1 T atment of a ut attack
a Ergotamine Tartrate U S P B P
(1) Ergotamine ta trate I M th ag nt and route of ho e 0 25 0 50 mg (1/240 1/120 g) will relieve h adache within an hour in most cas s Administer drug a ea ly in attack as possible Do not repeat dose more often than onc weekly
(2) Ergotamine tart ate by mouth 4 to 5 mg (1/15 1/12 gr) sublingually or orally contin with 2 mg (1/30 gr) ev ry hour until heada he has disappear d or until a tot l of 11 mg (1/6 gr) has been administered This method of admin tration is not g n rally advis d be caus of th poss bility of overdosage If the p tient vomits as r ult of his disea e it impossible to know how mu h of the drug h has abso b d Ergota mine is also less effect al by th se rout s
(3) Toxic eff cts A few p ti ts complain of numbn ss and tingling of ext emities and some muscle pains and t ns on *Do not administer ergotamine to pa- tients in septic or infe tious states or who have perip eral vascular disea e arterio- sclerotic heart disease or who are pregnant*

b Dihydroergot mine (D H E 45®) (not ac pt d) in do s of 1 0 mg (1/60 gr) I M or I V m y be substit ted for ergot mine tartrate Injection may be repeated n one h ur if necessary
c Ergotam ne with affein (Cafergot®) or atropin i some tim s mo effe ti by the oral r ute al ne and r q ires a smalle total dos It is vailable as suppo to ies f r ctal use if emesis pre ents ral admini tration
d Pr ssure on extern l carotid or one of it b an h s e rly in th attack will often aboli h p in
100% oxygen by na al mask may r liev the ac te attack
2 G neral measure
a U t l drug begin to reliev h ad che have patient at st in a hair
b After h da he ha be n el eved patient should rest in bed for t l ast two hours in a q et d rken d room w th out food o d ink This will promot relaxati n and is ne essa y to prevent anothe attack from o curring immediately
3 Ab rting an atta k Many pat nt may abort their tt cks by the f llowing m ans
a Attempt to gain maximum l xation by a wa m bath
b Re t in bed in dark ned room fo several h rs
c D ug
(1) P tobarb tal S dium U S P Pentoba bito S d m B P 0 1 Gm (1 1/2 g) by m th
(2) E gotam n Ta tr te U S I B P 3 4 mg (1/20 1/15 g) bli g lly
(3) A etyl li yl A id U S P B P (sp ri) 0 6 Gm (10 g) with o w th ut cod ne 0 06 Gm (1 g) by m outh m y be sef l in mild att ks
4 P event o of f rth r tt ks M g a s a psy hosomati dise R du tion i atta ks may be ac omplished by psy hoth apy Th re is l ttle evide ce that sp i l di t gl d lar th rapy nti allerge c m as re ete a ff cti x ept a psy hotherap ti devic s

C H tam e H ad ch (Horto s C phal lgia) S bc ta eo s in j t n of 1 mg (1/60 g) hist m e ba (in histamin diph s ph t solutio) m y s metime rep oduc th h dache withi 3 5 m n t s Des sit tion to histamin th r fo has been d ocated sta ting w th small d s of h stam dipho phate (0 25 c) b i d and inc ea ing ch dose by 0 05 cc until a 1 cc d e is e h d Ther aft r a ma nt anc do e of 1 t 3 times w kly s inj cted

D Di of Blood Ve ls Sin e many of the e ondit o re a soci ted with o p t ph nom na v sodilato s re i di ted Ni otin c Acid U S P 100 mg (1 1/2 g) t d t q i d or lly ha b e fo d to b of limit d v l e

HEADACHES DUE TO MUSCULOSKELETAL INVOLVEMENT

Mu l contr tion or sp sm m y b c us d by d s a f the m s l adjac t t u tu es or m y b as oc t d with c sa f tigue o motion l t nsion Th m s l att ch d to the oc ip t mo t freq ntly inv l d d give th ha a t risti ipit l

headache There may also be a fe ling of pressu e or tightness or a band lik constriction of the head associated with emotional ten sion The psychogenic headache usually appears after pe iods of emotional stress

Tr atment

A Muscle spasm due to organ c disease and bone or joint pain may be rel eved by appropriate phys cal therapeutic measur s (see page 323) Analgesics are usually also of value (see p ge 3) *Specific therapy should be d rect d at the un erlying disease*

B Mus l Ten on He daches

1 Rest relaxation and freedom from emotional stress are of primary importance (s e Psychotherapy on page 36)
2 H at t the involved muscles by means of hot towels heat ing pad or a warm bath will help relieve the discomfort
3 Gentle massage of the muscles w ll usually also be f benefit
4 Drugs may be of value in acute cas s but prolonged use *should be avoid d*
   a Phen barb tal U S P Phenoba bitone B P 15 30 mg ($1/4$ $1/2$ gr) q d w ll temporar ly l e e many headaches du t n ous ten on
   b Ac tyl al cylic Acid U S P (asp rin) 0 3 0 6 Gm (5 10 gr) every 3 t 4 hou may a so b of benefit
   c Tranquil ers (e pag 337 and 338)

THE DEGENERATIVE DISEASES

MULTIPLE SCLEROSIS (code No 906 953)

A disease of unknown t logy characteriz d by patchy demyel inization in the central n rvous sy t m wh h may be du to a asso c ated with *diffuse v nular thrombo* It is *manifested by diffus* n urologi al d sturbances etrobulbar neu tis nyst gmus slu red speech int nt on tr mo and sp t c paralysis C S F xamin tion shows nothing haracteristic Th disease is slowly p gres sive with spontan ous tempo ary remis ions

Tr tment

Ch fly symptomatic Vasod l t rs (inhalat o of 5 10% ca bo dioxide h stami e infusions amyl nitrite inhalations) are ad cated for treatment of acute relapses by som exp rts

A Rest Adequ te sle p t night and est n the aft no n has b e found to make patients m re comfort bl
B Temperat re Changes Avoid s dd n chang s in t mp rature (xte nal or i ternal) to red e vas ula p ti phenomen n (lthough vid nce th t pa m plays a rol in the dis e s qu stioned by s me) Heat mak th se p ti nts m ch wors *cold often* impro s them temporarily
C Rehabilitation physic l therapy and p ychoth rapy to att mpt to make the patient try to li e with his d sability and y t mak the most of whatever assets h s ll etai s

PARALYSIS AGITANS (Parkinsonism) (code No 946 4 953)

A syndrom char ct riz d by rhythmi al pill rolling tremor f sti g muscles with sso iated pa t city and igidity a tooped postu ma k l k fac s and a propulsive gait In later lif it is us lly as ociat d w th art rioscleroti changes in the b sal ganglia in younge life it is usually n with po te ceph lit c chang s in the basal ganglia

T tm t

Tr tment s m inly symptomati Little c n be done to arrest the pr gres ive posten phalit c or arte ios lerotic hanges that o r

A Sp ific M a u e A numbe of drugs ha b n found to b eff ti in all viating the symptoms of parki sonism Th se drugs are usually used in ombinat on to obtain the optim l the ap tic result

C ti In patie ts with pa alysis agitans n ver stop one drug ab ptly when instit ting therapy with a new on Always int o-du e th n w drug in sl wly in r sing qu t ti s whil grad u lly red ing the ld

1 Trih xyphe dyl Hyd o hlorid N N D (A tan ®) Eff c ti for stain d c trol of igidity mino tremor and akines D s g 1 o 2 mg (1/60 1/30 g) to 5 mg (1/12 g) t i d Fo oculogyric isis u 10 mg (1/6 gr) t i d Pri ipal ide act n same a for atropine but c d o a ula ffe ts mi im l Use w th ution i gla oma in high do age Artan ® m y cau e onf s o rest l ss e or hallu n tio s

2 Bell d nn lkaloids

At pine Solut on of U S P B P (1/2%) Eff ct e for sp sms d gidity pa ticularly in post ncephalit s St t with 3 d p do s t i terval f about 6 h ur in r as dos g by 1 d p e y 3 days until a dos ge f 10 drops t d s e hed Limited to y ng r p t ents be au of d ger of gl u om lde ly Ea ly t xic sympt ms blurring of vi ion dryn ss f m th ve tigo and t hy a dia E c ive dosag m y p d m ting d in s me tal c nf si nd hallu i ations

b Belladonna Tin t re U S P B P H s am ff t as atropin Start with 15 drop t d and in ease gradually t 30 d ps t i d Chief id ffe ts a same a f at opin Do ot gi t pat e ts w th glaucoma

3 D ph hyd mi Hyd hlo id U S P (B n d yl®) F t l of t mor Dosag 50 mg (3/4 gr) b i d to q i d

4 B n t pi M than lfo t N N D (Cog nt n®) M t ff t e ge t g st ig dity and p m lso against t m E ll t wh c mbi d with t ih xyphe dyl (A tan ®) w ll as ey imi (P gitan ®) o d tr mph t mi (De d ®) Chief sid tio dryne s f m th D ag B gin with 0 5 mg (1/120 g) 1 2 t mes daily and i cr d d p to 5 mg (1/12 g) daily

5 D t Amph t min S lfate U S P (De ed i ®) 5 mg (1/12 g) morning noo o Amph tamin S lf t U S P (B d i ®) 10 mg (1/6 g) to ou ter ct f tigue om n l e and l th gy

ANTISPASMODIC DRUGS

D g	Eff t On			
	T m	R g d ty d Sp ms	Ak (w k)	Oc l gy C i i
At op and b ll d n lk l d		x		
B t op n (Cog ti ®)	x	x		
C m ph n (P p it®)		x		
D i o mph lam (D q i ®)			x	
D ph hyd m (B d yl®)	x			
Eth p p in (P id l® Ly an ®)	x	x		
H	x			x
R b llo ® (g d t b l w)		x	x	
S m n m	x			
T ih xyph dyl (A t ®)		x	x	x

M d f d f m L J D h y Cli l App is l (P kin T m
Th M k R po t Ap i 1954 R p d d w th p m

6 *Hyoscine Hydrobrom de U S P B P Useful in c trol* of tremor Dosage ranges from 0 3 *mg* (1/200 gr) b d to q d in elderly pati nts to 0 6 mg (1/100 g) b i d t i d in the you g Distressing ide effects m y i lud *somnol n e dry mouth blur ed visio and drows ess*
7 Cyc min Hydrochlor de N N D † (P gitane®) Act on sim ilar to that of tr hexyphe dyl (Art n ®) but has less dry g effe t U eful whe effe t from trihexyphe dyl wea off Dos ge 1 25 5 mg (1/50 1/12 *gr*) t d to q i d
8 Caram phen hydrochlor d (Parp nit®) U eful in y g patients as mus le rel xant Adult dos ge 50 100 mg (3 4 1 1/2 gr) q d
9 Ethopropa ne Hyd o hlor de N N D (P rs dol® Lyso van ®) 25 30 mg (3/8 3/4 g) q d
10 Rabellon ®† (hyoscin hydrobromide atrop e s lfate and sc polam n hydrob omid) Ha elat ely l ttl eff t on tremor T blets ont n 0 5 *mg* (1/120 gr) of mix d b ll don a alkaloid G e in 1/4 1/2 or full t bl t dosag b i d to q i d d pend g n ag and t le nc of p t t Side reactions dryn *ss of mo* th and blurred visio
11 Procyclid ne Hydro hlor de N N D (K madr n®) Effects gainst rigidity *Does* ot p od the pro ou ed m uth dryness and bl r ed vis n of some f the other dr gs Dosage 2 5 5 mg (1/24 1/12 gr) t i d
12 Stramonium Tinct re N F B P E *pe* ily good for on trol of tr *mor ten o and x item nt St t with 15 d ops* t i d and increas slowly *to* bout 80 *drops* t i d
13 Tranquil z rs If patient is ten e and anxiou gi e Chlo promazi e Hyd ochlorid U S P (Tho a in ®) 25 50 mg (3/8 3/4 gr) at bedtim R serpine N N D (R s rpoid® Serpa il®) 0 25 mg (1/240 g) t i d or q i d o M pro- b m te, N N D (Miltow ®, Equ il®) 400 *mg* (6 g) q i d

†Contra nd ated in glaucoma

B Ge e al M asures

1 Physical the py Should l d mas ge str t h g of mu cles and active ex rcise wh n possible Patient should be t ught to ex rcise daily the muscles most se erely affected specially thos of hands fingers wrists elbows kn s and ne k
2 Reassuranc of control of symptoms and psych logical sup port w ll be gr t fully re ei ed by p tient
3 Avoid barb i r t P rmit moderate u of alcohol some time to r lax ten ion

Progno i

Th diseas is slowly progressi e but it is not fatal

CEREBRAL VASCULAR ACCIDENTS

Cerebral va ula a id nt are du either to thrombos s h morrhage or mbolism Th d fferenti l diagnosis i imp rtant in order t tr at the unde lying cau e (se table below)

Differential Diagnoses of Cerebral Vascular Accidents

	H morrh g (94x yx5)	Thrombo is (94x 619)	Embolism (94x 618)
Ag	45 65 y rs	Ov 45 y	Any ge
U al und r lying cau	Hyp rt nsion	Art ios l ros s	Ca d c di as
Ons t	Sudd n	Sudd n or r p dly pr gr	Sudd n
H d h	l t n	Slight or ab nt	Variabl
M ntal st tu	C p oma	N rmal to d ep com	N rm l to d p oma
Paraly	Compl t hemipl g a	Sl ght p is l hemipl g a	Slight p is to h m pl gia
Sp nal flu d pre ure	High	No mal l ghtly l v t d	Variabl
Blood in spi al flu d	U u lly p nt	U ually abse t	Abs nt o light

T tm t

A A ut Pha or Ons t

1 C mpl t b d est
2 Nursing care *Handl* pati nt ar fully to a oid injury to p ti nt and par lyzed xt mities
3 S d t (Pa ald hyd U S P) If pat nt is g t t d edat n ss y H w p t nt w th th ombosis hould n t be dep s d too mu h w th s d tives
   a Oral parald hyd 4 (1 dr) in milk, fruit jui e or wh sky epe t d as s ary
   b Re tal p raldehyde 8 15 (2 4 dr) in 30 cc of oil
   c I M p ald hyd 4 8 (1 2 dr) d p into th buttock
4 Feeding If patient i uncons ious o unable to wallow d not tt mpt to give f dings by *mouth* Maintain nutrition w th t be f eding by parent al m n

5. Phlebotomy If hemorrhage has oc urred and blood pres sure is elevated phlebotomy of 500 cc may be used to e duce chances of further ble ding
6. Lumbar puncture If hemorrhag has occurred perform lumbar puncture v y cautiously removing just enough fluid to relieve sever headache *Do not perform Quecken stedt s test* in patients with suspected hem rrhag
7. Voiding Catheterization may be necessary if spontan ous vo ding *does not occur*
8. Procaine block of the st llate ganglion has been recommen ded for thrombosis and cerebral embolism but is c ntra *indi ated in cases of hemorrhage*
9. Maintenance on anticoagulant therapy (p ge 215) which has been advocated for treatment and prevention of r missions of *erebral thrombosis or embolism may be of value in throm* bosis or nsufficiency of the carotid o ertebral basi r system and cerebral embol sm

B. State of R covery and Conval sc nc The rehab litation of the patient with hemipl gia d e to cerebral vascular cident should begin early nd should be intens The d t ls of the r habilitation program are discussed on pages 327 334 2

Prognosis

If the patient surv ves th acute att ck the prognosis *fo life may* be good With active rehabilitation most patients will b able to walk and care for themsel es Return of useful funct on to th uppe extremity is rare (These patients c n b t ained to hieve *a re markable degree of re ov y if gi en adequate ca e and rehabil* tation) Prognos for functional reco ery is poor in those patie ts w th severe residual o gani mental syndrom o se ory aphasia

HEPATOLENTICULAR DEGENERATION (Wilson s Disease)

This extrapyramidal d sea e haracter z d by p ogr ssive ntention tr mor ath tosis rigid ty dysphagi co tractur s *muscle weakn s d ment a K ys Fl is her ring ma* lation and as ociated li er dis as has be n r ported to be due to a defect of copp r metabol sm

Tr tment

Dimercaprol U S P B P (BAL®) h b r port d to b *effe ti e i removing th exce coppe* The lin lly u ef l do e is 2 5 mg (1/24 gr)/Kg body w ight by njection b t d for 10 to 12 day per ods e ery s o d month

THE CONVULSIVE DISORDERS

EPILEPSY (Idiopathic) (code No 934)

Epilepsy *is a* ymptom complex which may be chara t ized by one or mor of th f llowing manif stations (Len ox)

1. Imp irm nt of con iou n ss
2. Inv luntary movem *nt of* muscl s
3. Disturbance of the autonomic ne vo y tem

Diagn i

There are three major clinical typ s Th differential diagnosis is very important b caus the therapy of e h d ffer Ind viduals may have more than one typ of seizure Ele tr ncephal graphic study is indicat d in all p l pt c pati nts

A Grand Mal (d No 930 x01) (Rule out th r cause of convul s v s zu s) This type oc urs in all ag groups Th usu l form has g neralized toni and cloni convuls ns wh ch may begin f cally and remain s or m y spread without lo s of on iou n ss (Ja kson an) Th y m y o cur in singl atta ks varying in o urrence from hours to y ars

B P t t M l (code No 930 x07) Th usual f rm i cha ct r zed by a t an nt lap of con ousnes of 5 to 30 seconds and g nerally no convulsiv se zur o urs During the attack there s omm ly a rhythmical 3 per s c nd blinking of the y s It occurs most frequ ntly in children and is ra after age 30

C P y homot S u s (Ep l pt qu v l nts) (od N 930 x0x) Th s fo m i fr qu nt in adults and may b h r cter zed by p riods of utom tic beha The pat nt s motional content u ually nt r ly altered from normal during the attack The attacks vary in haracter and th patients ar often dang rou to themselves and society

D Status Ep l pti u (od N 930 x06) R p dly r curring ser es of g and mal type wh ch exh ust pat nt and may be fat l

T tm nt

Exc pt in tatu epilepti us no t atment gi en during an ttack xcept t k ep pati nt fr m h ing inju ed (e g biting his tongu)

A Grand M l *Never withdraw an anticonvulsant drug suddenly*

1 Diph nylhydantoin Sodium U S P Ph nyt in S d um B P (Dilantin®) is th drug of ho ce G ve 0 1 Gm (1½ gr) after e ening meal f 3 to 7 days in rea ing d ge by 0 1 Gm (1½ g) d ily e y w ek unt l sei ures are brought under cont ol If attacks ar se er and fr qu nt may b gin w th 0 3 Gm (4½ g) daily on f r t v t A erage do 0 4 0 6 Gm (6 9 gr) per day Aft r onvul s izur a nt lled the Dilantin® may be edu d f d s d but h uld symptoms ag in app a the dosage should immedi at ly b rais d ag in

Th are a f w t xt rea t ons to Dilantin® but most t oublesom is gum hyp rt ophy Thi s b st controll d w th a eful mouth hygi ne and gum ma ge Wh n la g d s s a give tax o d wsin ss m y app r (e p g 354)

2 Ph nob b t l U S P Ph nobarbiton B P If p ti nt on maximum d sage of Dilantin® and th r i in dequ te r spons gi ph noba bital in addition in ame m nn r and dosage as Dilantin® in reasing dosage as with Dilantin® *while maintaining patient at full dosage of Dil ntin®*

3 M thyiphe yl thylhydantoin (M santoin®) If exces iv gum hypert ophy results from the u of Dilantin® m thylph nyl ethylhydantoin m y be tri d in its place Th d ag is th sam M santoin® may be ff cti e where grand mal and

petit mal coexist Do not sudd nly chang to Mesantoin® but gradually substitute for Dilantin® *Combinatio of both* may prove more useful than the individual d ugs When *using Mesanto n®* special precautions should be obser ed for toxicity (see p ge 354)

4 Bromides primidone (Mysoline®) mephobarbital (Mebaral®) benzchlorpropamide (Hibicon®) *or ethotoin (Peganone®) may* be tried (see page 355)

B Petit Mal

1 Very mild state If attacks are infrequent (less than 1 p day) give no t eatment or treat only with small dos s of phenobarbital

2 Mild state

a Amphetamine Sulfate *U S P* (Benzedrine®) 5 10 mg (1/12 1/6 gr) 2 3 times daily may be t ied Do not us if patient also suffers with grand mal because this drug *may precipitate g and mal attacks*

b Glutamic acid 6 10 Gm (2 2½ gr) daily may de crease the number of attacks

3 Mod rate and severe states

a Trim thad one U S P (Trid one®) i the drug of choice *Tr methadione is very effective in petit mal ep l psy* but unfortunately is not an entirely safe drug since it caus s bone marrow depression in some indiv duals *Whenever this drug is used perform CBC once or twice a week for the first month then every two weeks for two or three months and monthly thereafter* Dosage B gin w th 0 3 Gm (5 gr) daily and increase *the daily dose by 0 3 Gm (5 gr) very 7 days unt l* at tacks are contr lled Do not give more than 2 Gm (30 gr) d ly

b If g and mal seizures o ur also trimethadi ne may aggravate this t nd n y therefor it may be nec essary to administer med cat *on for g and mal seizur* simul taneously and in some as s top the trimethadione

c Param thadione (Pa adione®) is aid to b less t xic than trimethad one It i almost q ally eff ctiv i petit m l attack nd may b eff ct v wh re other drugs fail Ob s rve precautions s for tr m th dione (s e p ge 354)

d Phensux mid (M lont n®) phen b b t l m thsux m d *(Celontin®)* a eta olam d (D mox®) m phobarbital (M baral®) may pro e us ful (s e p g 355)

C Psychomotor Ep lepsy Patients mu t b w tch d and gua d d to p nt jury to th mseI e r others

1 Diphenylhydantoin Sod m U S P Phenytoin Sod um B P *(Dilantin®)* w th r w thout phenobarbital as fo gr nd m l epilepsy is th tr atment f choice

2 Phenac mid *N N D (ph nyl cetylur a Phenurone®)* is effecti e in ontr l of psych motor epil psy Giv initi lly 0 5 Gm (7½ gr) t i d and incre se until ymptoms r *ontrolled* up to 5 Gm (75 gr) d ily divid d int 3 5 eq al do es The d ug is quit toxic nd prec utio s must be observed with its use (ee page 354)

3 Methylph nylethylhydantoin (Mesantoi ®) mephobarbital (Meba al®) primidone (*Mysoli e®*) *acetazolamide (Di mox®)*

a d methsuxim d (C lont n®) alone or in combin tion with oth d ugs a f que tly seful

D Stat Epilepti

1 Am ba b t l S d um U S P (Amytal Sodi m®) 0 5 1 Gm (7½ 15 g) I V may be g v I t ave ous Ph b b tal Sod m U S P Ph n b rb t Sod um B P 0 4 0 8 Gm (6 12 g) inj t d l wly m y be us d
2 Parald hyd U S P 1 2 cc d l ted in t ple volume of aline I V lowly If onvulsion ontin e epe t I V dos t t VERY SLOWLY AND CAUTIOUSLY or g ve 8 12 I M
3 D phe ylhydantoi S d m U S P Ph ytoin Sod m B P (D la tin Sod m®) may b inject d I V at ate not e d g 50 mg (¾ gr) per m ute A total do ge of 150 250 mg (2½ 4 g) may b requ r d
4 G ner l anesth la may be ed f all other measure fail
5 D la tin® As soo ed t v meas ff ctiv p ss tomach t be thro gh no e en if p tie t s till sciou a d g 0 1 0 2 Gm (1½ 3 g) D l tin® i water y 3 hours til seiz co t lled (max mum 10 dos)

E D t on of Tre tm t Mo t pil pti m t i e th apy f lif Howe e if i s r tr ly o t lled fo 3 5 ye the anti o vulsant d ug may b lowly (ver 1 2 years) w thd awn to ascert n f eizur s still oc u

F G r l Me s es Acqu t the p ti t with h d s In s t ble cas th m y b a compl hed n p t by r ad g books bout epilepsy (below) Epil pti pati t should a o d ha dous o p tions d iving a d i tivity It i im po tant to ma tain a regul p ogram f phy ical tivity K p the p t t i opt m m phy l co d tio d avoid ex ess f t g e F b d all al hol T at em tio al f cto s and at d Imp s upo the p t t the ab l te n ty f f thful dh nc to th d g egim An id ntif at on d sho ld be ca i d at ll tim (e bel w)

G B ks fo th Ep l pt c P ti nt (1) L ox S nce a d S i es H p a d B s ( ) P t m On Convuls ve S u es M al fo P t e ts J B L pp nc tt C

H E c g th pil pt p t t b me a m mber of Th N t l Ep lepsy L gu 08 N W lls St et Chicag 6 Ill o s P t e ts m y e e fo m t n g d g a h d t atm t f m th s o ga ti

Identificati n Card

<table>
<tr><td>THIS PATIENT HAS EPILEPSY</td></tr>
<tr><td>Name________________
Add s ________________ Phon ______</td></tr>
<tr><td>P t a padd d t k o padd d poo in h s mouth to p t th t gu K p h m from inj r g hims lf</td></tr>
<tr><td>D t s N me________________
Add s ________________ Phon ______</td></tr>
</table>

DRUGS USED IN EPILEPSY

D g	Indi i on	A g D ily D	T i R i ons	P t n in U	R m k
Diph ylhydant in Sodi m U S P (Dilantin®) Ph yt in Sodi m B P	G d m l S m a s f p y h mot pil p y	0 3 0 5 Gm (5 7½ gr) in divid d d	F w tions 1 G m hype t phy 2 N m s taxia h y t gm s	1 M intai g od d t l hygi 2 R d d g ift icity ppea	Saf t d ug f man g m t f g nd mal nd p y h mot epil p y M y c t l petit m l
M thylph yl ifyl hyda t i (M nt i ®)	G and m l S as t p y h m t pil p y Eff ti wh grand m l d p tit m l oe i t	0 3 0 5 Gm (5 7½ gr) in di id d d	1 N ou taxi y t gm 2 P yt pe ia 3 E f lliati de ma titi	1 R d d g 2 F qu nt blood unt 3 St p m di ti if kin ruption d lops	D n t gum hype t phy
T im thadion U S P (T idion ®)	P tit mal	0 3 2 0 Gm (5 30 g) in di id d d s	1 P ytop i 2 E f ll ti d ma titi 3 Photophobia 4 N ph is	1 As f r M t a® b 2 As f M antoin® ab ve 3 U ily di pp We d k gl 4 F q t u in ly i Di ntin drug if i l r d lop	Do ot i f g nd m l T idion ® m y agg a at thi onditi n
P m thadione N N D (P dion ®)	P tit m l	0 3 1 0 Gm (5 30 gr) in divid d dos		A f T id g	T i tion t t d t be l than with T id on ® Oth m ka f T idion ®
Ph m d N N D (Ph u on ®)	P y h m pil p y	0 5 5 0 Gm (7½ 75 g) n divided do	1 R p titi 2 P ot in i (b ign) 3 D m titi 4 R d h 5 P on lity hang	1 Li t n t t t t l F ll w y bili g t gul t t al 2 Stop d g Rew if p ti t i h ing m k d ll r m y onti 3 Stop d g 4 St p d g if 5 Stop drug if	

Ph ob b l U S P Ph b bi on B P	All p l p p lly djun t	0 1 0 4 Gm (1½ 6 g) in divid d d	1 D in 2 D m titi	1 D d 2 S p d g d m l t op d g If d m titi ti ly	On f af d g M y m tim gg s p y h m t i T i tion
M phob b l N F (M b l)	A pl b b it l	0 2 0 6 Gm (3 12 g) i di id d d	A pl ob b t l	A pl b b t l	3 m tyl d l t l pl b bit l M t b di twl d g n d t g ph ob bi l
B mid (Pot ium Sodi m B mid U S P , B P)	All pil p p lly djun t	3 6 Gm (45 90 g) in divid d d	1 P y h 2 M tal d lin 3 A f m kl h	Stop d g m y um t l w dos g	R ly d w Eff ti t tim wh ti l t il
B l p p mid (H bi on®)	G and m l	1 4 Gm (15 60 g) i divid d d	1 Skin h 2 M y tim l t m p t	1 S p d g 2 D d top d g	U l l onjun tion w th h anti onvul ant
M h b l N N D (Gem il)	G and m l	0 1 0 8 Gm (1½ 12 g) in di d d dos	D w in	D dos	E pe l lly ff t l l oci t d with g nl b in d m g and infantil myoclonl p l p y
P m dos N N D (My l ®)	G and m l	0 4 2 0 Gm (6 30 g) i di id d dos	1 D w 2 At l	1 D d 2 D d top d g	U ful i j with th ti onvul ts
Phe m d N N D (Milon ®)	P t m l	0 6 2 4 Gm	1 N 2 At l 3 Di in 4 H m i	1 R d d g 2 3 di anti 4 Di ti	
Ph m d (C l ®)	P mal P y h m t p l p	1 2 Gm (0 3 Gm q i d)	1 At 2 D w l 3 Ski h	1 De da 2 3 di ti	
A l m d N N D (D am ®)	G d mal P t m l	1 3 Gm (0 25 Gm t d)	1 D 2 P th i	R d d	C l l l l U t l t
Eh in N N D (P ganon ®)	G d mal	2 3 Gm 4 d d d d f m l	1 Di 2 F ig 3 Ski h	1 R d d 2 3 d ti	

NARCOLEPSY

Narcolepsy is a clinical syndrome charact rized by r current episodes of uncontrollable d sire to sleep It is frequently associated with a transient loss of muscle tone (cataplexy) especially during emotional reactions

Treatment

A Amphet mine Sulfate U S P (Benzed in ®) 10 175 mg (1/6 2 3/4 gr) da ly m y be required Optimum dosage may be determined by starting with dosage of 10 mg (1/6 gr) e h morning and increas ng by 10 mg ncrements through the day T to 20 mg (1/6 1/3 g) t i d is an aver g dose

B Eph drin Sulfate U S P Ephedrine is not as s tisfactory as amphetamine but is helpful in many cases Optimum siz and distribution of dose varies with patients Ave age ra ge of dos is 25 50 mg (3/8 3/4 gr) b i d q i d

DISEASES OF THE CRANIAL NERVES

TRIGEMINAL NEURALGIA (code No 964 x30)

Trigem nal neuralg is hara teri d by sudden atta k of excruc at g p in of short duration a ywhere alo g the d str but on the 5th cran i n v The atta k normally precip tated by st mulation (usually mild) of t igger ne in th s ea of th pain

Tr atm nt

A Medic l tr tment s g n ally nsat factory but the f ll w i usually are tr d before re t ng to urgery

1 Tr hl roethyl e U S P (Tr lene®) 15 20 d ops p r day by nhalation from h dk hi f in a ngle or d d d sea o e half ho r b fo m ls

2 Mass e do es f t mi B₁ (1000 mi r g ams daily by n j t on fo 10 d y) ha e be r port d to el e th re p in of t g minal n ur lg a

3 St lb m d ne isethionat N N D h s ently b en h wn to pr duc a chemic l n rop thy aff t g th facial and c l sk n r G 0 15 Gm (2 1/2 g) f eshly d s sol ed in 1 0 cc 5% gl os n d t lled wat I V o r a per od f o h lf hour A es of 10 d ly nje tions re m de Rel f l p may b delay d | t 5 mo th until the ch m al europ thy oc r l a sm ll p r nt g of s t e t d with stilbamid n npr d table and t o blesome fo m cation d par sth ias of th fa o

4 Anti onvuls t e g D phenylhyda toin Sodi m U S P (D lantin®) 0 1 Gm (1 1/2 g) q i d or sodii to a g Tol zol e Hydr hl r d U S P (P i oline®) 50 mg (3/4 g) q i d h ve be r po t d ben f l in som cases

B Surge y may be requi d if th is r lief from m d cal tre tment

BELL S PALSY (Pe ipheral Facial Paralysis) (code No 865 y10)

A pa ly is of all the m l of one sid f the face us ally p ipitated by xp ure chill o t auma

T tm t

A ur the pati nt th t recov ry u ally occurs g ally in 2 8 w eks it may take up to 1 2 yea s in lder pat nt

A P ote ti of Face
1 k p f w m and avo d further exposu e
2 Prote t eye with a pat h if n s y
3 Avoid wind and dust

B Physi l Th apy
1 Support f by u e of t p or wire f m angl of m uth looped about th ear
2 Electr l timulat n m y be us d to help p e t atrophy of mu les Us e y 2 d y after th 14th day
3 Ge tl mas age in an upward di ction fo 5 10 minut s 2 3 t m daily of th invol d muscles may help th tonus
4 H at f om inf a r d lamp may h t re very

MENIERE S SYNDROME (code No x00)

M ni syndrom i a sympt m compl x of unknown et ol gy whi h involv s th l byrinthin portion f the 8th n v It mani fested by s dd n r cu re t atta k f ve t g naus vomiting ny t gmu and tinn tu and by p ogr ive d fn s

T tm t.

A Sp f M u s Non av l ble

B G n i M s
1 Re s ce i impo t nt Many of these p t nts ha m k d p y hi overl y
2 S lt fr d t and Ammo um Chlo d U S P B P 1 2 Gm (15 30 g) q d m y be helpf l
3 Ni otini A id U S P (in ot tin mid) 50 100 mg (3/4 1 1/2 g) I V b i d to t i d 100 mg (1 1/2 gr) o lly 5 6 tim s d ily h b en fou d useful
4 Th a t histamines p ially D ph hydramine Hyd hlo de U S P (B dryl®) and Dim hyd inat U S P (Dramami ®) in do of 50 100 mg (3/4 1 1/2 gr) 3 4 t m d ily app to be of b fit to me pat t
5 S ct o of the v tib l p tion f the aff t d 8th c l ne m y p vid ll f in e c ot r ponsi to m di l r gime s

DISORDERS OF EQUILIBRIUM

ACUTE LABYRINTHITIS (code No x85 910)

A te labyrinthitis i an a t inflammat on of th inner ar whi h u lly follows pir tory inf ction and is manif t d by int e vertig us ally with marked tinnitus a st ggering g it and ystagmus

Treatm nt

A Specific Measures None available

B G ner l Measures

1 Bed rest pref rably in darkened room until symptoms subsid

2 Drugs

a Antibiotics are of little value unless there is a ociat d infection of middle ear or mastoid

b Antihistamine drugs may be of some value (as for mo u sickness see below)

c Sedation is generally helpful Phenoba bital U S P Ph nobarbitone B P 15 60 mg (1/4 1 gr) t d to q i d

d Chl rprom zin Hydrochlorid U S P (Thoraz ®) 50 mg (3 4 gr) I M (or other phen thiazin deri a ti es see page 42) is us ful n the ac t early ph se

MOTION SICKNESS (code No 010 576)

M t on sickn ss is an acute illnes char teriz d by anor xi nausea dizzine s and vomiting Many f ctors play l in its produ t on the princ pal ones b ng visual kin stheti d psy ho log cal Physiolog cally the e tibular apparatus app ars to be involved

Prophylax s

Pr entive measu es re often effecti Attacks f moti si kness ar difficult to tr at su cessfully

A The ntihistamines appear to be of b ef t D menhydr n t U S P (Dr mamine®) or Diph nhydr min Hydrochlorid U S P (B nadryl®) 50 100 mg (3 4 1 1/2 g) q d s said to be very eff ct ve

B Mecli ne Hydrochl r de N N D (Bo mine®) s l ng ting effe tiv g nt Th usu l do s 50 mg (3 4 gr) y 6 12 hours

C Cy l in Hyd o hl ride N N D (Mar ®) s eff t ve oral or I M d ses of 50 mg (3 4 gr) r p t t 4 6 hours p r n

D Par ympath ti d pressant alo o in combinat with m ld sedativ s S opolam n Hyd brom de U S P or Atro pine Sulf t U S P 0 2 0 4 mg (1/300 1/150 g) ry 3 6 h u s

E M ld S d tion Ph ob b tal U S P Ph nob b to e B P 15 30 mg (1 4 1/2 gr) e ry 3 6 h ur m y h lp pre e t ttacks

PERIPHERAL NEURITIS (code No 98 y10)

Per ph r l n ritis an be cau ed by a larg n mber of f tors both local and gen l Th may b eith r s n o y invol m t (w th pain paresth sias and ther ubje tive n o y d st ban) o motor inv lvem nt (w akne s d p aly is) but mor fr q tly both

A Toxic Fo ms E g lead a m r ury o d phth ia toxins

B I f t s Gu ll in B e type of mult ple neur t
C D fi e cy Typ Esp lly of th B compl (be b i) i oft a ted w th up impos d toxi eu itis s h as th l o holic p lyn u itide d b t c n ur p thy
D T m ti D to d rect inj y to th n

Tr tm t

T tm nt in h d pends p n th etiologic l f tors

A Sp c f T tm t

1 R mo nox ous agent g l chol l d sour V tam B compl Att mpt t obtai optim l met bol m f ner t e by l b al us f v t m espe lly B com pl x Thiam e Hyd o hlo de U S P A i e Hyd hlo id B P 15 mg ($^1/_4$ g) t i d to b i d o lly o p te ally d D d Y st U S P (b w s y t) 10 30 Gm ($^1/_3$ 1) da ly f e ti e B compl (se p ge 62)

3 A t t h gh l ric d t i Ind t d

4 I l d polyn rit s of ch l t g ag t such a Ed th m l C l m d dium N N D (EDTA V e ate®) m y b be f l (p g 54)

5 I e ical p lyneur t s Dim cap l U S P B P (BAL®) (ee pag 536)

B G l T tm t

1 B d t Pl c pat t b d if po ibl a d avo d u of ff t d l mb If low tr m ty aff t d k p adl ov fo t f bed to p e e t p e sur of bed c e A lgesics e ess y to o t l p (se p g 3)

3 Phys l th apy (page 333) Aft p has subs d d phy l th r py (m ss g a d p i m tio) m y be of v l e E ou ag t e moti n at th s m time P e t t t es by m ans of plint d p st t hi g

HERNIATION OF INTERVERTEBRAL DISK (code No 2511 9x9)

Comp ss and i jury t e oot may b ca s d by h ni t n f an int rv t bral d k M t commonly th lumb s l i t e t b al d k (L5 S1 L4 L5) a aff t d in th cas s th ymptom ompl of low b k p in impa d a g f mot o of low r b ck p av teb l l mba mu cl p sm and pain diating l g th iat di t b ti n ommonly ounte d O s t f linic l ompl i ts is f qu tly r l t d to p od s inv lving low b k t i back injur or f ll Th initi l pi d m y b f ll w d by an t val f ympt mat improv m nt

Exagg at on of symptom ti c mplaint f llow f qu tly pon la ghing t aining sn zing

T d s in s atic t h al g cou of th c ti n r mp ir d t a ght l g raising d min hed nkle j k impa d s n t o o d st ib t on of L5 of S1 may be dem nstr t d

Ch a t isti oe tg l g l d f t in th b hn d pac s lly p od d by h t d interv t b l disk and e dily d mon t bl by my logr phy

Treatm nt
A Sp cific Mea ure None available
B G n al M s ure
1 Bed rest preferably in darkened room until symptom subside
2 Drugs
a Antibiotics are of little value unl ss there is associa ed infection of middle ear or mastoid
b Antihistamine drugs may be of some value (as fo mo... sickness see below)
c Sedation is generally helpful Phenobarbital U S P Phenobarbitone B P 15 60 mg (1/4 1 gr) t i d to q i d
d Chlo promazine Hydrochloride U S P (Thoraz ne®) 50 mg (3/4 g) I M (or othe ph nothia e d r va ti es see page 42) is useful in the acute ea ly phas

MOTION SICKNESS (code No 010 576)

Motion sickness s an acute llness hara ter ed by an e a nausea dizziness and vom ting Many fa tors pl y a ole in t product on the prin ipal ones being vi u l kin sth t nd psy ho logical Physiologically the vestibular apparatus appea s t be involved

Prophylax s
Prev nti e m s ures are often ffe t e Att ks of motion sickness are difficult to treat successfully
A The ant histamines appea to be of benefit Dim hydrinat U S P (Dramam ne®) or D phe hydram n Hydr hlo d U S P (Benadryl®) 50 100 mg (3/4 1 1/2 g) q i d said to be ery ffectiv
B Meclizi Hyd o hlorid N N D (Bonamine®) s long acti g eff cti e agent Th u ual dose i 50 mg (3/4 g) ry 6 12 hours
C Cyclizine Hydrochlor d N N D (Mar i ®) s ff ctiv r oral o I M dose of 50 mg (3/4 gr) epeat in 4 6 hou s p r n
D P rasympath ti d pressants alo e o in omb nation with m ld s d t s Scopol m Hydrobrom de U S P or At o pine S lfate U S P 0 2 0 4 mg (1/300 1/150 g) every 3 6 hours
E Mild S d t on Ph ob b t l U S P Ph n b b itone B P 15 30 mg (1/4 1/2 gr) eve y 3 6 ho m y help p v nt ttacks

PERIPHERAL NEURITIS (code No 98 y10)

P ripheral neu iti an be u d by a l rge number of f t s both local and g eral There may be eith r nsory in l m nt (with pain p esth ias nd other subj cti e ns ry d stu ban or mot r invol m nt (w kness nd p aly) but mor fr quently both
A Tox c F ms E g l d ar n m r y or diphth ria toxins

therap tic test of *Neostigmine Methylsulf* t U S P (Prostigm n®) 1 5 mg (1/45 gr) w th At pine Sulfate U S P 0 6 mg (1/100 gr)(diagnostic ampul) sub t m y be used This ca ses relief of symptoms

Treatm nt

A Emerg ncy T tm t Pat nts m y dde ly de elop inability to *w llow or r sp ratory ses* P t nt should alw y arry 2 ampul s of 0 5 mg (1/120 gr) of Neostigmine Methyls lf t U S P B P This should be gi n immedi tely subcut or I M if severe symptoms d velop Th patie t sh uld b *pla ed* und medical care at once and if addit onal neost gmine is need d 1 mg (1/60 g) may be gi n p ente ally 2 3 tim in on hour until ad quate r spons is obt in d

In pite of dministrat on of increasingly larg mount f neost gmin p g ssi w kne s f muscl s f respir tion m y oc wh h may be f tal in some cases

1 When such an e t an be anticipated *trach otomy s t* oxygen equipment s ction pp tu and respirator should be availabl
2 Following tr h otomy patient is pl ed in spir to *Oxyg* dministered d d Neostigmine is withheld At pine Sulfate U S P 0 6 mg (1/100 gr) s gi n to k p a rway d y d tion of airway employ d
3 M int i fluid and elect olyte b l *n e du i g artif ci l r* pn tio pe od G v antibiotic to p t p eumo i
4 Aft r a few d ys it is lly po ble to gr d lly d the t m p t in the respirator as t le at d
5 I pat t wh vi e risis m o may occ r in s m i stan l ti g f se er l y

B Spe f M

1 N ost gm e B omide U S P B P *15 mg (1/4 g)* at t blets Dos a i f m 4 to 12 t bl t daily Begin w th 1 t bl t ve y 4 hou s (4 tim s d y) and in do g equi ed to gi l f
2 *Eph dri S lf t* U S P 12 mg (1/5 g) w th e h d of eostigm fte e han th tion of t gmi
3 P t i m has lso b n fou d of val to ppleme t tigmine It mu t howe b *g ve in clos t t i d* es 4 6 Gm (60 90 gr) Pot sium Chlo id U S P 6 tim s a d y This t ind cated if di c o r al dis is p se t
4 Ed oph ium Chl id N N D (T nsilo ®) m y relie my sth we kness 10 mg I V gives reli f in 0 30 c d 25 50 mg I M gi es ir p o m t l ti g for ho Two to 3 mg (1/30 1/20 g) I V m y be us d a a t t d se f p ti t u d t tme t to distingui h b twee mya the i isis (imp o) and o ertr atm t (o chang)
5 Pyr do tigmin bromid (M tin ®) a nalog of o tigmi e *is at time* mor eff t in t e tme t f b lba m cle weak ess It i uppli d in 60 mg (1 gr) tabl ts Do ge 10 25 tabl t d ily t int v l p ed to pro d maximal l f
6 Ambe onium chlo id (Myt las ®) i *said to* t twi as long a n o tigmine and h f w r id eff cts St rt with 5 mg (1/12 gr) t i d and incr se Averag d 5 25 mg (1/12 3/8 g) q i d

Tr atme t

A Gen ral M a u es

1 In acute phase bed rest heat applied locally to be k anal gesics and use of a bed board under mattress are indicat d

2 Traction to the low r extremities is frequently b n ficial

3 The avoidance of severe physical effort and strain is essen *to minimize recurrence of symptoms after th initial episod*

4 Use of low back belts braces or supports may b ben fi cial *It is important to instruct patient as to p oper m thod* of bending lifting (with knees flexed) and carrying (w th object held close to body)

B Surgi al Measures Where respons to cons rvative measur i poo or when r currences ha e disabled the pati t surg *therapy is indicat d Gratifying relief of the major complaint* of most patients i e pain usually follows th succe sful *removal of the offending herniat d disk Recovery of other* neural fun tions (impair d motor pow r muscle atrophy and sensory changes) may be expe ted later

MYOPATHIES

MYOTONIA

(Congenital code No 270 044) (Acquired code No 270 x20)

Myotonia is a disorder characterized by d ff ulty in relaxation of skeletal muscles following contra t on which is initiat d eith r by voluntary effort or by mechanic l or le trical stimulation It is important to differenti te this dis ase from myasth nia (see below) becaus treatment with neostigmine or potass um agg avat s myotonia

Tr atm t

Quinin Sulfat U S P B P 0 3 0 6 Gm (5 9 gr) 3 4 times daily may lle iat th symptoms

PROGRESSIVE MUSCULAR DYSTROPHY (code No 270 9x9)

A disorder h ra t riz d by progr ss e wasting and we kness of muscles with sociat d p eud hypert phy (fat inf lt ation) f *certain m scle g oup It is important to diff re tiate this from* my sthen g avis becau the l tter an b b n fited by tr atm nt

Tr tm nt

Non of val It has been sugg ted that inability to metabol z vitamin *E may pl y a rol in th dis se but par nte l r oral* administrat on of this substanc h s b en of n b fit

MYASTHENIA GRAVIS (code No 270 562)

Myasth a gravis is a disorder *ha a teri d by w kn s and* mark d f t gability of oluntary m s les Re v ry from w kn s *or fatigue oc urs with r st or spe if m di at ons* The dis progress s by natural o *spont ne r m on* and r laps s A

Chapter 15

METABOLIC AND ENDOCRINE DISEASES

DISEASES OF THE PITUITARY

In the d agnos and t tm t of doc ine di ord s it m st be em mbered that there is a very close interrelat onship of the riou endocrin gans N t only do ho mo e exe t a p ofound eff t o ll tiss es f th body but th e docri gla ds al o ex rt trong infl e ces pon o e a oth Fo this reason the manifea t tio of ndocrin d s e m y be either prim ry to a giv n end rin gla d o seco dary i e d to inv lv m nt f t rg t gla ds Fo exampl the patie t with hypopituit riam m y p e t with a p t re f f a k myx dema and unl ss it is app eciat d that the p ima y dist rban e s in th p tuit ry dmin ist at of thyr d s bst c w tho t simultaneous s of cortic d an e lt in a rio dd s nian isis

PANHYPOPITUITARISM (code No 841 777) HYPOPITUITARY CACHEXIA (Simmonds Disease) (code No 841 7773)

Orga i hypop tuitarism s d e to d tru t o of th t io pituitary which m y be ca ed by tumo s of the gland o post part m h mor hage (Sh h n synd om)

The term panhyp pit itarism s po ibly a m nomer sin e th signif a t variati n in ymptomatology f m ca e t as may be d e to varying d f i es of the se ral te o p t itary h mo s Hyp p tuitary ca hexi i al o mi l ding term i c th pat ts m y b of no mal w ight r m y a t lly be b s Sympt ms of o gani hypopit it rism sually in l d w ght l w akn s s n t vity to old l of ppetit a d in f m l ame o rh a Phy i al xaminati n ev ls l tha gy lo of axillary a d p bic hai nd at ophy of kin a d g nitall Labo tory findi g s f llow low B M R low di iod ne ptak PBI i s d in uli e tivity low i ary 17 k t st o d d o ti st oid x etion and low in ry g d t opin tio Thes manifestations due la g ly to l k of pituitary tio f e rt n ta g t d i e gl ds (thyr id g ds (l t)

C <u>Gene al Treatment</u> *Acquaint patient with his disease using simple lay terms* *M aintain good nutrition and health*
D <u>Surgery</u> *Thymectomy is claimed to benefit some patients*

<u>Prophylaxis</u>
Id ntifi ation card neostigmine and a syring are to be carr ed at all times giving the diagnosis and method of treatment

THIS PATIENT HAS MYASTHENIA GRAVIS
Name______________________________
Address____________________ Ph ne______
If observed to be behaving strangely or if he is found unconscious call for physician or ambulance
Physic an s Name______________________
Physician s Address_______________ Phone______
Two ampule of neostigmine and a syringe and needle are in his possession These must be administered hypodermical y into his upper arm immediately

<u>Management During Pregnancy</u>
Immediat ly after d liv ry childr n of pa ients w th myasthenia may have sev re s gns of the disease Immediat t eatment with neostigmine is necessary to pres rve life After a few days the symptoms may disappear and the hild thereafter does not suffer from myasth nia

FAMILIAL PERIODIC PARALYSIS (code No 270 x95)

A dis a e of unknown etiol gy ch racterized by recurrent atta ks of fla c d paralys s of th muscl s of the trunk and extrem ities and by a lowering of the serum potassium level during the attack Imm ed ate relief of symptoms by admin stra on of potas sium chloride is usually diagnostic

<u>Tr a m nt</u>
A Potassium Chlorid U S P B P *5 10 Gm (75 150 gr) or lly when diagnosis ha be n mad and then 5 Gm (75 gr) b i d q i d during ac te episode as needed to prevent weak n ss or paralys s*
B *In emergencies only may g e prepared sol tion con a ning 1 Gm (15 gr) Potassi m Chloride* U S P B P *n 50 60 cc distilled wate nje ted very slowly I V This is a dan gerous pro edure (s p g 25)*

<u>P o hylaxis</u>
A *A oid high carbohydrat foods (e g dy sta hes sugars)*
B Routine administrati n of 25% aqueous solutio *Potassium Chlo ride* U S P B P (or enter oat d tablets) *8 12 Gm t i.*

GIGANTISM (code No 841 7761)

Pitut ry gig ntism which is c d by ad noma o c n r of the pituitary is prin ipally a result of hyp ec ti n of the growth f ctor Growth which curs p imarily at th epiphyses of long bo is ymm t ical a d gene alized and pati nts may ttain a stat of s v fe t o high G owth is poss ble only if the over cr t o of hormon occurs p io to the on t of epiphys l clos re L l p re symptom of th pituita y tumor may ause he d h s diz s a d vis al distu bances An el vated erum in o ganic phosph is one of th best diagnostic sign of a tivity Gly uria m y b pres nt

T tm nt

T eatm nt is aimed at pp sing th pituit ry growth horm ne

A End rin Th apy If gigantism is fo d in adol enc and th s l tti cro hme t of the t mor pon adj c t truct (i opti s) giv l g a ting t tost n (s p g 420) 400 600 mg v y 2 4 w eks d Ethinyl E tr diol U S P 0 1 0 5 mg by m uth d ily M l hould ve la g do f t t o nd fem l ls g r do es f est ge Th s th piphy w ll pre t f ther g owth by ca g los of th piphy nd m y i hibit p tu ta y growth ho m e s tion *Do not use methyltestost rone*

B S g y nd X ray Th py If the is m k d n oachm nt upon v l f lds x y therapy pp rs to b of val e If x ray the py doe not o t l tum growth s gery must be con id d

ACROMEGALY (code No 841 7762)

Hyp s c et o of th growth f ct of the a te i p tuita y d e to d n ma ca cinom f the gl nd whi h d velops aft r the bo y ep phys ha e f ed res lts in clinical pict e of p og r siv gr wth of soft tis es a d thi k ning f bon The di ea usually h s t on t d ing the 2 d 3rd de ades it is hara te d by on pic o s nl g m nt of the j w nos suprao bit l dg s ha ds and f et d thick ning f th skin nd vis ral n l rg me t Elevation f th ino gam s rum phosphorus is n im port t diagnosti p int if th serum phosphor is orm l th di e e i probably ina tiv nd requires no f rth tr tm t

T tm t

A f r giga ti m (e bov) Favo bl r lt hav be epo t d in some as with e doc ine th rapy

Differentiation of panhypopituitarism from anorexia nervosa (functional hypopituitarism) may be difficult Psy hic distu bance may be found in both conditions although a history of specific emotional stress or long standing psychiatric symptoms is more suggestive of anorexia nervosa The nervosa patient is usua y more alert and active and more able to withstand stress The axillary hair is usually not lost in anorexia nervosa but is almost always lost in organic hypopituitarism The low ur.nary gonadotropic level (less than 3 mouse units per 24 hrs) of hypop tuitarism may be of aid in diagnosis but is not definitive Improvement following special feeding technics and failure to respond to spe ific endocrine treatment would further suggest anorexia nervosa

Tr atm n .

There s no effective pituitary replacement preparation therapy must therefore be aimed at correcting the end organ deficiencies This must be continued throughout life Almost complete replacement th rapy can be carried out with cort son

A <u>Cortison e or H drocortis ne</u> 7 5 to 25 mg per day is u ual adequat This should be gi en in divid d doses 3 4 times daily

B <u>Thyroid</u> Thyroid (a d insulin) should rarely if ever be used in panhypopituitarism unless the patient is receiving cort one Because of lack of adrenal cortical fun tion patien s are exceedingly sensitive to these drugs For this reason one should exercise spec al care in differentiating myxedema from hypo p tuitarism often a diff cult problem

Begin with small doses of 15 to 30 mg (1/4 1/2 gr) daily and gradually in rease to tolerance 60 to 100 mg (1 1 1/2 gr) is usually ad quate

C <u>Sex Hormones</u>

1 Te t)st rone May be used in both mal s and fem les primarily for its t ssue building (prot in anabolic) effect <u>Dosage</u> One of the longer acting pa ent ral testo terone prep rat ons (ee page 4 0) 100 300 mg e ery 3 4 weeks Methyltestosterone U S P B P 10 to 0 mg orally in males) femal s th dose of these d ugs s half that for males If vi ilizi ng signs appear in the f male the drug should be stopped and these signs will d sappe r Viriliz ng signs us ally do not result if the dos is kept under 400 mg per month

2 Estrogens Thes ge ts ar used i i the female for their mild anabolic effe t their eff ct on se ondary s x chara teristics a d their poss bl neutralizing ff ct on androgens D ethylstilbestrol U S P t lboestrol B P 0 3 to 0 6 mg or Ethinyl Estradiol U S P 0 02 0 5 mg daily or lly

<u>Note</u> S x hormones especially est og n sho ld be mpl yed ca tiously in young p i hypop tuit ry patients or the piphyses wil close before maximum growth is ach eved

p bably ne ry At times of st s specially in puberty and d ing p egnancy and lactation the requirement rise a high s 200 1000 mi rograms (0 2 1 0 mg) daily

Ab m l M t bolism

Although the iodine requirements are v ry slight in many are s of the United Stat s and Is wh thes requirem nts cannot b m t from local food and water sources

A Simpl Iodine La k (Simpl Goit) Endemi goiter or colloid goit is ha a t d by enla g ment of th thyro d gland a d is d to l t v or absolut iodi e def iency with s condary wo k hyp t ophy of th gland There s often a history of livi g in an iodin def ient geographic are Symptoms appear only if th e largem nt is uffi nt to s p e ure on su oundi g str ct res (esophagus trachea or rec rre t laryng al n rve) Th e i no e d e f eith hype o hypofunction and accordingly the B M R s um p tei b und fodine and cho l st ol and dioi dine (I^{131}) uptake are us ally n rmal

B Hypothyroidism In this condition the gland fails to m nuf c tur d quate hormone Thi may have vario ca es (1) m e complete odin lack than in simpl goiter (2) inflamma tory dest ti of the gla d (thyroiditis) (3) exce sive surgi cal removal (4) f il re of th pituitary to elabo at thyr tro pin In hypothyroidism the B M R radioiodine (I^{131}) uptake and blood organi iodine are f eq ntly low (the latt i below 4 micrograms p r cent)

C Hyperthyr idism This diseas is haracteri d by an x s siv e tion of thy id hormone The uses of thus a ob re b t it is beli ved that in many c ses th p im ry diff ulty m y be excessiv e retion of a t o pituit ry thyrot opi hormone Thi excessive s etion causes a spe ding up of metabolic fun tion especially th oxidative m hanism of cells Th is a resulting in e se of B M R th blood levels of o ganic iodine a e fr q ently abov 8 mi rograms pe ent and th I^{131} ptakes a high

DISEASES OF THE THYROID

NON TOXIC DIFFUSE GOITER (code No 810 943)
(Simple Goiter)

Dia gnos

Th i often a hi tory of living in an end mic ar Symptoms appea only if the enla gem nt is o gre t as t pressure o urrounding truct re (sophagu trachea o re urrent larynge l n rve) Th B M R nd the rum prot in b und iodin and radioiodine (I^{131}) ptakes a n rm l

T tm t

A Sp ifi Me es

1 Thy o d U S P B P 60 120 mg (1 2 gr) especially if th g it r i multinodul appears to be of v lue in about 50% of ses

DIABETES INSIPIDUS (Due to Unknown Cause code No 842 779)

Destruction of the posterior pituitary or impaired function of the s praoptic nuclei o of tracts from these nuclei to the posterior pituitary (63% of cases being d e to tumor) caus s the c ndition known as diabetes insipidus This is manifested by sev re thirst and marked polyuria A polyuria of over 6 liters per day with specific gravity below 1 006 is highly suggestive of diabetes in sipidus The d agnosis is established by the Hickey Hare test This test consists of (1) I V infusion of hype tonic s lt solution which in patients with diabetes insipidus causes an incre s d urine flow and (2) administration of a test dose (0 2 0 3 cc) Vasopressin Injection U S P B P (Pitressin®) which caus s a decrease in urine flow

Tr tm nt

A Sp if c Th rapy Vasop essin Tannate N N D (P tressin T nnate®) 1 cc in oil I M is th treatment of choice It is eff ctive fo f om 24 to 72 ho rs It is usually best to admi ister the dr g in the evening so that maximal r sults can be ob tain d during sleep Patients learn to administer th drug themselves and the dosage is adj st d as ne essa y Posterior pituita y sn ff inhaled 2 3 times a day may be used b t it is q ite irritating and absorption is unc rtain The dose varies from 30 60 mg The aqueous p epar tion (V sopress n In jection U S P Pitr ssin®) is rarely used in chro c treat ment because of its hort d rat o of act on (1 4 hours)

B Non p cif M a res Mild cases (or Pitress n® re stant cases) r qu e o tr tment other than ad q te fluid ntake

C X y the apy may b u ed in treatm t of some cases of tumo (e g eo inophil c granuloma)

THYROID

The thyro d gland utili s ino ga ic od to form a complex physiolog cally a tive thy ox n prote n ompound th t s nec ss ry for normal body f ct o Th orm lly f ti ing gland r mo s the ery l w con ent ations f ino gani iodi e p es t in blood synthesizes it through diiod tyr si e to thyr xin and p ssibly tri iodothyro e and lib at s the a t ve mater als prob bly m b nat on of the 2 or 3 organi compounds bo or d r vati es there of bo d to p otein When a ex es of ino g iodin is p ese t in the blood the thyr d cells p ck it p and t e it n org n f m in the colloid of the follicle Under th influ e of th nt r or pi uitary this collo d mate ial n b ele sed with its activ pri c ple into the blood st eam Th l ulati g o ga i odine is quit co tant in health ranging from 4 8 m og ams per 100 c of blood

The r quirements for iod e are v y slight a d diffic lt to estimate About 20 200 (0 02 0 2 mg) micrograms per d y a

1 Pat ts with s ver myxed ma myxedema heart dis ase o elde ly p tient with hypothyroidism with othe a oci ated he t dis ase CAUTION Beg with small do es 8 15 mg (1/8 1/4 gr) da ly for 1 we k a d incre a dose e ery week by 15 mg (1/4 gr) da ly up to a t tal of 100 to 200 mg (1 1/2 3 gr) daily This dosag hould be o t n d until s gns of hypothyr idism hav va i h d or t xic symptoms pp a th stabiliz dos ge so as to maintain the B M R o pr tei bou d iod e at normal j st b low the l vel of to i ity (se below nd r Hyperthyroidism)
2 Pati nts with e ly hypothyroid sm may b t rt d with large dos s 30 mg (1/2 g) daily increasing by 30 mg (1/2 gr) ev y w ek to th li n t of tole ance
3 Ch nic mainte ance Each patient s do e must be adjusted t obtain the optimum ffect Most p ti ts eq i e 60 to 130 mg (1 2 g) daily fo maint an e Optimum do ge an b t m t d by foll wi g p tein bound iod e B M R b t l i al j dgme t is ft th b t guid
4 When r pid e p n e i ne essary Sod m L thyronine N N D (t i dothy ni Cytomel®) m y b mployed B gin with ry low d ses bec use of ts sp ed f action B gin w th 0 005 mg a d inc s slowly (s e p g 415)

B *Needless Us of Thyroid*

1 Que tionabl diagn si If any pati nt can tol rat abov 200 mg (3 gr) daily of thy o d the diagnosis of hypothy oid m sho ld be qu tion d No mal indiv dual and obe d oth no hypothy oid individuals can tolerat do es p t 300 t 500 mg (4 1/2 7 1/2 gr) da ly without chang in B M R or d v lopment of toxi ymptoms
2 Nonspecific s of thyroid The e of thyroid medi at n as nonspecif stim lat ng th r py s m nt on d only to b ond m d It has b n shown that the do sually em ployed (100 to 200 mg r 1 1/2 3 g daily) ineff tual in ltering the m t bolism of n mal ind v du l

HYPERTHYROIDISM

I th p st it had be n t mary to l s ify hyp thy oidism a co ding to th gr ss anatom l h t ist of th gla d as
1 Diff Toxi Go t (wh ss iat d with exophthalmos Grave di a) (od N 810 943 6)
2 Nod la Toxi G it (od No 810 952 6)
3 Hyp thy oid sm W tho t G te (od N 810 771)
How v in t tm nt i aim d p im rily t th di t rb d phy iol gy a d inc th n id n that the e a y diff r c i th alt ed phy l gy th i dis ssi n nd th ommon h ding of hype thy id m m ju tifi d

Diagn i

A Sympt ms N rvousn s ir itability y f tigability a d w ght lo in pite of ex i ppetit and food i tak

B Sign

1 P ti t m qui k i all his m m ts
2 Wa m and moi t skin

2. Iodine therapy (early) If the enlargement is discovered early it may disappear completely with adequate iodine Five drops daily of saturated solution of potassium iodide or Strong Iodine Solution U S P Aqueous Solution of Iodine B P (Lugol s solution) in 1/2 glass water is adequate th rapy Continue therapy until gland returns to normal size th n keep on maintenance dosage or use iodized table salt
3. Iodine therapy (late) If the enlargement is of long standing, iodine therapy as above may be used but much regression in the size of the gland should not be expected

B. Indications for Surgery
1. Signs of p essure If signs of local pressure are p esent the gland should be removed surgically
2. Potential malignancy Surgery sho ld be considered for any thyroid gland with a single nodule for the chances of a single nodule being malignant are q ite high This is particularly true in younger people and when there is no response to treatment

Prophylaxis

With an intake of 100 200 micrograms of iodine daily this condition should not occur During times of stress (puberty preg*nancy and lactation) the upper limits of this dose may prove* necessary This amount is satisfied by 1 2 Gm (15 30 gr) of iodized salt (1 5000 1 10 000 parts iodine) daily

HYPOTHYROIDISM (code No 810 7722)

Diagnosis

A. Symptoms Early weakness easy fatigability cold sensitivity

B. Signs
1. Early These are few and may be diffi ult to find dry skin and hair brittle nails and menstrual distu bances are suggestive
2. Lat r Hair tend to fall out (especially yebrows) sweating dimini hes fa b comes puffy (es ly about th eyes) then non pitting edema spreads to the rest of the body Patient may d velop anemia and h art disease
3. Ob sity is an uncommon finding in true hypothyroidism

C. Laboratory Diagnosis
1. Low B M R A B M R below -30% is s ggestive but not diagnostic of hypothyroidism A low B M R does n t necessarily mean hypothyroidism thi i especially true in obese patients (See Obesity p 390)
2. Serum iodi e A low prot i bound odine of u der 3 5 4 0 micrograms per cent (d pe ding on the method us d)
3. Decreased radioiodine (I^{131}) uptake (below 10% in 24 hours)
4. Other significant finding include elevated blood ch lest rol (above pati nt s normal) and in severe as s an mia

Treatment

A. *Specific Thera y* Thyroid U S P B P is the preparation of cho ce Initial dosage varies with the s verity of the hypothyroidism

drug ontin ed the B M R will continu to f ll until th pat ent becomes my demato s

(1) The drug ppe rs to b ide l except f 2 fact s

(a) D ng f t xi react ons especially gran locyto p ni *This app rently happ ns v ry infreq ntly* with p pylthio ra il and ca be a iti p ted The patient xamin d w kly a d weekly o bi w kly blood count tak n If th WBC fall below 4500 or if l s than 45% g n lo ytes ar present therapy hould b discont n d Other ra e a t ons ar drug f ve d a h

(b) Th s nd obj tio i of a technical nat re since th gla d m y main hyp plasti and v cula s gi l r moval i mo e difficult Beca se of this ombi d the apy s g propylthiou cil a d odine is p bably the method of cho e i prepar g p t nts fo thyro dectomy (se below)

(2) D sag The py is usually co tin d and s rge y d f red until B M R is n rmal Th re is o n d *to ush s gery there is io d ng r of escap* as with iod n

(a) In ev e a es 100 200 mg q i d is gen r lly d q at

(b) In rare ca es espe i lly w th v y la ge gl nd la g dos may b ec s y

( ) In mild c 100 mg b i d m y be ed l th ugh th larg d es a ot m h rmf l

b Methylth ura l U S P almost th m as p pyl th o a il n m de f ct a d do g Toxic ct n m y be m f eq nt

M th m le U S P (T pa l ®) The a tion f th d ug is mil to that of th thiou c l Th do g a about 1/10 1/15 that of p opylth ra l Th v g dos 10 15 mg ev y 8 hou Th mall do ag no gua t e ag st t xi ti s wh h m y be mo comm n with th d g th n th thio l

d l th r il S d m N N D (It m l®) Th iod n t d th o r l s l im d t b g t g i Alth ugh m fa abl p t h be p bli h d th r h e b en port f g d al ap wh le o th d g well a se of postop tiv is D s g 100 300 mg t d to q d

2 *Iodin* *H* be n d f y s I d g i d ly d g of 5 10 d op of Str g Iod e S l tio U S P Aq o Sol t f Iodi B P (Lugol s ol t on) tu t d l t o f pot i m iod d with o pe f th py (s b l w) unt l th B M R h s d opp d t b l w 20% th gn and ympt m h v de a d and th p t t h b gun to g in w ght Th di d t g s with odi s f ll w

A f w p ti nt m y n t po d p c lly thos who h i d iodine e tly

b If th e i too lo g w it bef s gery th gl d may pe a d th p t nt d lop a m e ve hyp thy o di m than b f

3 Fine tremor of extremities usually present in severe cases
4 Marked weight loss and emaciation
5 Goiter (at times a bruit may be heard over gland)
6 Exophthalmos may be marked
7 Cardiovascular findings vary most common is tachycardia but in older patients especially with long sta ding hype thyroid sm cardiac failure and auricular fib illati n ar not uncommon

C Laboratory Findi gs
1 Ele ated B M R may be present in other condit ons s ch s fever mal gnancy (e pecially leukemia)
2 Elevated hormonal iodine Above 8 mcg % is suggestive but this may be seen in pregnancy with ex essive adminis tration of thyroid and after therapeutic or diagnostic use of iodine containing organic compounds (e g drugs used fo gallbladder or kidn y visualization)
3 In reased I^{131} ptake may be diag ostic In doubtful cases with elevated I^{131} uptake lack of depression of uptake on thyroid or sod um liothy onine medication may be d gnostic
4 The blood cholesterol l vel may be low

Treatment

Treatment is aimed at stopping the excessive secretions of the thyro d Sev ral methods are in use and th method of choice is still open to debate and varies with each cas The mo t widely accepted method however s ad quat preparat on followed by sub total surgi al removal

A Subtotal Thyroidectomy This is probably still the m thod of ho ce s ce it dem nds the l ast in follow up ca e Ad quate preparatio s of the utmost importance One or drugs are gen r lly ne es ary for adequat pr paration iodine and/or one of the thiou acil g o p of dr gs

1 Thiou a il drugs (drugs of hoi e) Recently several th uracil d ugs or sim lar deri atives have been i trodu ed They a Propylth o ra il U S P B P Methylthioura il U S P Methimazole U S P d o e cont ining od ne in the molec l ioth o ra il Sod um N N D (It um I[®]) The modes of action of the fi t thre ar probably ident cal that of iothiou ac l is st ll not ntirely lear

a Propylthiouracil U S P B P This drug has been most wid ly used nd app s to be the le st toxic It is the thiou ctl p paration of choic The mode of a tion of this dr g is su h that when given in adequate do age it pr vent the thy oid gl nd f om in o po ating inorgan odin into its organic (horm nal) f rm Thi ffe t i very rap d (with n a f w hours) d c ntin es as long a the d g is given The gland o t n s to attempt to m uf ct r the hormo e (r mai s hyperplastic o becomes more so) b t none s mad B ca se of this th B M R invariably falls the rat of fall depend g upon the total qu ntity of p evio sly manufactured protein bound i din available from the gland or in the circulating blood (More p ot in bound iod e is p se t if iodine has pre v ously been given) The verag time r q ired fo th B M R to retu n to no mal is about 4 5 w ek If the

poss bility of carcinog nesis (which has not y t b en ob rved) a d the poss bility that an early carcinoma which might b moved s gically may rem in undetected Be a s of th bove facto s its e should g rally be limited to olde age g o p (40 o abov)

D C u s Iodi e Th py In th pa t this method was used in some s lect mild cas of hyperthyroid sm w th fai results however beca se of th da ger of escape and b cau of th d cov ry of propylthiouracil iodine sho ld be used only for p eop at v preparation

E X ray Th rapy Has been used in skill d ha d with good sults a s b titute for rgery but b ca s of th tim n es ary to obtain ompl t ff t (3 6 months) this mod of th py should be erved f r le ted cases it is rarely in *dicated when I131 is available*

F G ral M s

1. Rest The pat nt with hyp thyroidism sho ld be t bed est esp ially in vere cas a d in p parat n fo s gery W th th advent of p opylthi u a il milde cases are b ing treat d s ambulatory pat ents How v ly b d est hast ns re overy
2. Diet Di t ho ld be high in calori s p ot in nd vita mins Th s pati nts n um g t quantities of food are gen r lly in n gative nitrog n balanc and n d th x ss foods nd vitamins b c us of th i in a d m t boli needs S ppl m tal vit min B omplex sho ld gener lly b mployed
3. Sed tion When f t th e p tients re oft n v ry n rvou S dati n is always helpful and v ry la g qua ti tie may be nec essary t t l ympt m Phenoba bital U S P Ph b bitone B P 30 mg (1/2 gr) 3 6 times d ily may b ne essary
4. Testoste o p opionat Thi d g has been shown to be of val e in esto ing po itiv nit gen balan in thes pati t M y admini t 25 50 mg I M d ily o 2 3 tim p w ek Do not u m thylt t t in hyp thy o d m s th gg v te the e ti u l d m to agg a t th hype thyroidism

G T tm nt of Compli ations

1. E ophth lm Th x t s of exophthalmos i still k w Although it m y b d e t i se tio of ante i p t it y h mo the evid i t lli co l i e It h b hown that ex phth lm i d e to ed m d lat llul i f lt atio of th p io bital ti s s (muscl con t ve ti f t t) Rem ving th thy oid s ti n (by tirp tio r dmini t ti of p pyl thiou il) doe ot a ily h lp thi diti d may gg t it l di g to m lignant x phthalmos It has be n s gg st d th t this s d to th f t th t th thyroid e ti ts inhibit y ff t o th ant i pit tary r m al of th gland allowi g the ant i pit it ry to e r t mo ho mon and gg v t th ondit Som i esti gato b li th t xophth lm oc u with hyperthyroid i m b c e the thyr id s c tion in hyp thyr idism m y be qu litati ly ab o m l and be a s thi b mal

c It is generally impossible to bring the B M R to normal with iodine

3 Combined propylthiouracil iodine therapy The adv ntage of this method is that one obtains the complete inhib tion of thyroid secretion with the involuting effect of iodine This can be giv n in 2 ways

a Propylthiouracil followed by iodine This appears at present to be the method of choice Begin therapy with propylthiou acil about 10 21 days before surgery is con templated (usually B M R about +20) begin the iodine *and continue for 1 week after su gery*

b Concomitant administration of the 2 drugs from the start in dosages as fo the individual drugs i e 100 200 mg propvlthioura il q i d a d Strong Iodine Solution U S I Aqueous Solution of Iodin B P (L g l s sol t on) 10 15 drop daily

B Continuous Propylthiouracil Therapy (Medical Treatment)
Cont ol of hyperthy o d sm w th propylthioura il alone witho t s rgery has been advocated by some

1 The advantage is th t it avoids the risks and postope ative compli ati ns of su gery e g myxedema hypoparathy roidism

2 The di ad antage s the remot possibility f tox c r act o s (se p 371) plu th eces ity of watching the patient care f lly for sig s of hypothyroidism Since th ad ent of propyl thi urac l it appears that the possibility of toxic r ctio s i slight The p tient must repo t to the physician *if fever* sore throat or d rmatit s d v lop

3 D sage

a Begin with 100 200 ng t i d to q i d and ontinue th s dosage u t l th B M R s norm l a d all s gns and symptoms of the di ase ha e subsided then place the pati nt on a m i ten n e dose f 50 75 mg da ly ke p ing h k on th B M R or prot in bound iodin to avoid hypothyroidism

b An alt nat m thod is to co ti ue with d e of 50 200 mg t i d to q d This will bri g the patie t to hypo thyroid lev l keep h s B M R o p otein bound iod n normal with thyro d (*This may be the p ef rr d treat m nt of xophthalmi goit r ee p ge 373*)

c Durat on of th apy The duration of th rapy and recur rence rate have not b en ompletely wo ked out How ever at p esent it would seem that of th pati nts kept on propylthiouracil between 6 and 18 months (the dosage slowly decr as d) about 50 to 70% will show no re *currence* Incre sing the durat on of th py to about 2 *years or* more does not in rease the cure rate

C *Radioactive Iodin* (I^{131}) The administ tion of radioiodine *has prov d* to be an excellent m thod for abl tion of over *functioning* thyroid tissu Th rati nale of t eatment is that *the* radioiodine being concent ated in th t yroid will destroy *the cells* that con entrate it Its use m y be lif s ving in as s of thyro d *carcinoma* when the cancer tis u an take p iodin Because special te hnics are ne essary to measure and handl the I^{131} the m thod *is still g nerally limited to larg r m dic l* centers The only objections to dat

hyperpyrexia tachyc dia and C N S hyp ri ritability and d lirium The ca se is uncertain but absolut o relativ adrenal o ti al insuffici n y may be important

a Gene al treatment Att mpt to control the hyperpyrexia with cold packs a d the hyp ri ritability with sedation
b Sp cific measures There is no certain sp cific ther py However the use f la ge do es of co ti otropin (ACTH) and the corti ones (s p 424) may be life ving The admini trati n f l ge do es of sodium iod de 1 2 Gm (15 30 gr) I V and repeat d every 12 24 ho rs has been advocated

DISORDERS OF CALCIUM AND PHOSPHORUS METABOLISM

NORMAL CALCIUM AND PHOSPHORUS METABOLISM

C lcium

A Int ke Cal ium is rdinarily d ived from th diet Av r ge adult d etary intak is 0 5 0 8 Gm (7½ 12 g) d ly and is n rm lly ad quate Du ing pregnan y and la tation th e quir me ts a e highe the range being 1 5 3 0 Gm (22½ 45 gr) daily

B Abs pti C l ium is absorb d in th small int stine S ver l fa to s influen e l ium ab orption
1 Vit min D N ded fo proper bsorption
2 Pr sence of fatty a ids or c rtain minerals (magn sium pota ium) may i te f re with alcium b orption
3 pH of int stin Incr ased acid favo s b o ption
4 Disease of th GI tra t (g chronic di r hea pan re tic d fici ncy) which distu b motility and int rf r w th ab orption

C Int rm diary M tabolism
1 Blood Calcium x sts in plasma in 2 f rms a diff ible fracti n (45 60%) containing the ioni ble active mat ial d a non diff sible which is bound t the globulins Wh n blood c l ium valu s a e r ported th e a e the total (diff sible and non diff sibl) al ium and m y be l w wh n protein level is l w b t the phys ologi ally act ve ioniz ble portion may b n rm l th r fore always d termine se um p otein when rum c lc um i d termined
2 Bo e Bon is a v ry acti ly m tabolizing tis ue Th e is constant breakdown o r so ption (ost clasti activity) co stant new bone m t ix f rmation (teoblast c a t vity) and const nt alcifying of this matrix The ct vity of building p th n w bone (o t oblastic tivity) is associ t d with th pre nc of alkali e phosphatase en yme nd its lib ration into th blood this nzyme i in ased when o t oblastic ctivity i inc a ed
3 E cretion Cal ium is xcret d in the uri and tools Mo t of th stool c l ium is d riv d from unabsorbed dietary al ium and vari s with c l i m intake and b orption The urinary cal ium vari s with the amount absorbed b t the va iation is not as great a with the tool cal ium

secretion does not have any pituita y depressing effe t Therefore it would seem ratio al to tre t this co d tion by giving thyroid o ally

a Thyroid dosage Immediately after surgery or after B M R has return d to almost norm l (+20%) with propylthiou acil therapy begin giving thyroid 100 200 mg daily G e dosage adequat to mal tain B M R at about +20% Thi therapy should be sed whenever there is a te de cy for progression of the exophthalmos al tho gh it is not always effective

b Phys cal prot ction of eyes Dark glasses protect o from dust eye shields tarsorrhaphy and other meas ures may be necessary Ophthalmog al co sultation should be requested

c Corticotropin (ACTH) or corti ones The use of th se agents in larg doses has b en proposed In s me c ses they have proved helpful They probably act by red cing the infl mmatory reaction which occurs in the peri o b tal tissues

d Su g y of malignant exophthalmos Every patient with exophthalmos should have actual and p riodic measure m nts made with an exophthalmom ter One sho ld not rely upon linical judgment to determine wh th r or not exophthalmos is present or prog essing In severe pro gressive cases where co neal edema limitation of extraocular m scle movements and failing vision occ r it becomes pra tically a s rgical em gen y to save the ey sight The operation of cho ce is orbital decom pression

2 Ca diac compl cations Whether or not thyrotoxico is itself can ca se he t d as is still unsettled how ver a num ber of cardiac omplications a e at times assoc at d w th hyperthyro di m

a Tachycardia S m degree of tachycard a is always found if norm l rhythm s pres nt in thyrotoxi os s This r quires only the tr tment of the thy otoxic sis

b Congest ve fail re This tends to occur in long tanding thyrotoxico s sp cially in th older g gro ps Ther py is the same s for congestiv fail r from any c u e Digitalis seems to be effective in co g st ve fail re asso ciated with thyrotoxi o is (see p 197)

c Atr al f brillat o May occ r i associ tion with thy o toxi osi T at as a y othe t al fib llatio but do not t y to co ert th atri l f brill tio in a toxic pati nt Most ca s w ll r rt to orm l hythm soo aft r to city s r mov d How e f fib ill tion rem l s for 2 we ks aft su g ry o for 2 4 w eks ft r B M R has returned to no mal u ing p opylthio racil th rapy one should o sid r u of q nid ne to onve t to a normal rhythm (f no ont dic tio s ar prese t) (see page 200)

3 Crisis o storm Fort nat ly this condition i rare with modern fo ms of th rapy It oc urs now mainly with inad quately thio r cil iodi e t e t d p t nts imm di t ly aft r subtotal thyro dect my It is characteriz d by

la d down in adequat amounts however the matrix that is dep s ted is lcified normally

Blood.

A Cal i m Di ord (Normal values 9 11 mg %)

1 Hypocal emia Ob erved in a number of abnorm l ondi tions If seve t tany results

a Hypopa athyroid sm

b O teomala i if sev re of whatev etiology (e g that associated with steato h a a d res lting in improper cal ium ab rption)

c Due to phospho us retent on by th kidn y (g n phri t s) which causes an elevat d s rum phospho us

2 Hype alcemia

a Hyp rparathyr idi m

b Multiple my l ma or othe dis ases with high m p otein

c Overd age with dihyd ot chysterol (A T 10) o v tamin D

B Ph sph us Di ders (Normal adult val es 2 4 mg %)

1 Hypoph phat mia Oc u s in hype parathyroidism nd may occ in osteomalacia but low serum pho pho u valu s a e rare A rar ca of hyp ph sphat mia is the de Toni Fa oni synd me

2 Hyperph phatem a S rum pho phat l v l levat d in g wing hild n nd in a om galie Th high st serum ph spho u levels are found in nal f ilure whi h ca s s phosph r s t ti n

HYPERPARATHYROIDISM

(Adenoma. code No 820 8046A) (Hyperplasia. code No 8 0 943 6)
(Osteitis Fibrosa Cystica Generalized code No 200 773)

An in e in pa athy oid horm lt ng in pho pho s and calci m l s from th b dy An xi na a and polyur a o r Evid nce f b d l if ti n is found o x y and shown by th p nce of p th l gi al f t s C nj tiv l al if t on e al st and ft ti alcifi ati m y sult Wh n l al ul f und s sp t hyp pa thy idi m L b t ry t di r eal high m al i m low um ph sph high o no mal pho ph t and in r as d tubul ph phat b ption

T tme t

A S gery If pa thyr id tumo th u ual a i found it h uld b mov d gi ally

CAUTION Aft g ry patient m y in th ourse of sev ral hou d velop t ta y s a result of rapid fall f blood cal um Th l um l v l may only f ll to the n rmal ng b t d e to th rapid alt ratti n in l v l t tany may b pre ipitat d The py i s f hypopa thyroid t t y (below)

B F ce Fluids. La ge fluid intak is ne ss ry so a dil ted u in will be reted a d minimi th formation of nal l uli f om l ium phosphate

Pho phorus

I hosphorus is involved in many metabolic reactions and in some of these it acts with calcium In general the e is an inverse ratio between calcium and phosphorus in the blood When calcium is high phosphorus usually is low and vice versa

A Intake Phosphorus is a rich constituent of many food tuffs and shortages are unknown except in starvation

B Absorption Most phosphorus is absorbed as simple ino ganic phosphorus

C Intermediary Metabolism (Blood phosphorus level is usually from 2 to 4 mg % in adults)

1 Bone Phosphorus moves with calcium into bone to form calcium phosphate salts

2 Phosphate ion (PO_4) is very important in many metabolic reactions and the potential en rgies of these phosphate bonds espe ially with carbohydrate are the sources of much of the ntire body energy In carbohydrate metabolism $PO_4^{=}$ forms hexose phosphate bonds and in fat metabolism it acts through the phospholipids It also participates in n cleic acid metabolism

ABNORMAL CALCIUM AND PHOSPHORUS METABOLISM

Bon

Most abnormal calcium and phospho us metabolism is concern d with abnormal osteogenesis Therefore to understand the therapy of the diso ders of calcium and pho phorus m tabolism one must understand the abnormal physiology and the physiological diffe en es between the metabolic diseases of poorly calcified bone

A Osteomal i A disorder of calcium or phosphorus m tabo l sm of such nature th t there is absence of or poor depo tion of calci m salts in the normally fo med osteoid mat ix The weak ned bone the efore is s bj cted to many m chanic l stresses which act as stimulants to the o teoblasts to lay down more osteoid matrix Th in reased o teoblastic activity leads to an el vated s rum alk line phosphatase Th se um c lcium and/or phospho s may be dep essed or normal The product of calcium times phosphor s is generally decr ased

B Osteitis Fibrosa G neralisat or Cy tica A diso der of c l cium or phosphoru met boli m n which there is increa ed re sorption of bone d e to hype pa athyro dism The excessive parathyroid hormone probably has a dual acti n it diminishes renal tubular reabs rption of pho pho u causing ex essive phosphorus loss and cal ium phosphate is mobilized from bone raising serum calcium which then spill over in urine Th re is p obably direct stimulation of osteoclast by the hormone Sinc the bon is weakened the e may be add d t esses a d strains as in osteomalacia which may stimulate osteoblastic activity and cause a high serum alkaline phosphatase This results in a high serum c lcium a low s rum phosphor s and a high calcium and pho phorus excr ti n i the urine

C Osteoporosi *Strictly speaking* osteop ro is is not a calcium or pho phorus m tabolic disorder It is d to a decrease in the osteoblasti activity and hen e th prot in matrix is not

ph sphoru and h lp esto e se m cal ium lev l to no mal in thi c nd ti

6 Aluminum hydroxide gel may be mployed to help l w r th erum phospho us (s e p 302)

OSTEOPOROSIS (Senile Osteoporosis code No 200 798)

Oste p osis oc u most comm nly in po tclim cter pat ents It is als found associat d w th oth co dition le ding t general l ed t s e atrophy e g m lnutrit on particularly d to low pr t in intake Cushing s yndrome e ss ve u e of co ticot op n (ACTH) o th ort o es d us at ophy (whe e timul to o t o- g nesi s ab e t) crom g ly r may b ld op thic

The f r t compl int is usually b ka he Th re x ray evi d nce of ra f t on sp c lly in l mb r ve tebrae and pelvi a d oft n c llap e and f ture of vertebral bodi s Oth r pathologi al fra tures may oc The blood alc um pho pho s nd alkalin ph aphatase a e norm l

T tme t

A Spe if c M su s Vary with the a s but ombined h m th rapy u ually indi at d

1 Po tclim teric (mostly in females)

E t og may b f val in timulating o teoblasts B fore beginning st og n th apy in a postm nopa sal woman p rform c reful pelvi xamination to ule out n plasm or oth abnorm lity a d warn pat ent or a relativ th t vaginal bl ding may oc r Administer st oge daily except f f rst 5 or 7 cal ndar d y of a h month nd th n p at cy le

(1) Diethylstilbest ol U S P St lboestrol B P 0 5 2 0 mg daily a tol t d

(2) Ethinyl Estr diol U S P 0 02 0 05 mg daily a tol ated.

b Testoste n For its prot in naboli eff ct nd hen its t nd n y to lay d wn bon matrix testo t on m y b u d in *addition to estrogens* Give 10 20 mg methylt st st o rally *Avoid overd sage* in femal exc siv e m y c us appe ran e of m l ond y e xual hara teri ti s How v thes will gre s if th py topped

2 Old age a d idiopathi As f po tmen pa sal both t stos t r and e trog n sh uld b u d in both m l s and f male

3 P t t with malnutrition Ad quat diet i of gre t im port n H w v the hormone may b sed as bov if respon t di t lon i poo

4 C shing di (e p 383)

B G l M s

1 Di t Should be high prot in high c lcium (milk nd milk produ ts d sirable) Vitamin s pplem ts sp ially vitamin D 2000 5000 unit daily m y be give al o

2 A ti ity P tie t ho ld be kept a tive e n in bed by u e of ti o p s i x i

HYPOPARATHYROIDISM (Unknown Cause code No 820 x10) (Injury due to Operation code No 820-415.x)

A deficiency of parathyroid hormone usually occurring post operatively following thyroidectomy or surgery for parathyroid tumor or hyperplasia It is characterized by muscle weakness irrit bility tetany a low blood calcium high or normal blood pho phorus normal phosphatase and normal bones by x ray (except after removal of parathyroid tumo) Cataracts may occ r par ticularly in young persons

Treatment

A Eme gency Treatment for Acute Attack (Hypoparathyroid Tetany) Usually postsurg cal and quires immedi te treat ment

1 Calcium Chloride U S P B P 5 10 cc (1 2½ dr) of 10% solution I V slowly until tetany ceases or Calcium Gluconate Injection U S P B P 10 30 cc (⅓ 1 oz) of 10% solution I V may be given 10 50 cc of either solution may be added to 1000 cc of 5% glucose in water or salin and administered by slow I V drip The rate sho ld be so adjusted that hourly determination of urinary calcium by means of the Sulkowitch test will be positive

2 Parathyroid Injection U S P 50 100 units (½ 1 cc) I M or s bcut 3 5 times daily as nec ssary to prevent tetany Do not use parathyroid hormone fo ov r one week because refractory state tends to develop rapidly Use only as long as absolutely necessary A tually pa athormon is rarely ever used it is not very practi al and usually not necessary

3 Calcium salts should b given orally as soon a poss ble calcium gluconate 4 Gm (60 gr) q i d c lcium lactat o calcium chloride 2 3 Gm (30 45 gr) q i d

4 D hydrota hy t rol N N D (Hytakerol®) should be giv n as soon a o al calcium is b gun Begin with 4 10 c (1 2½ dr) of oily sol (1 25 mg pe c) orally d ly fo 2 4 days then red ce dose to 1 2 cc daily fo 1 3 we ks d then d te mine maint na requireme ts

B Ma te an Tre tme t

1 High alcium low phosphoru d et (mit milk)

2 Calcium salts as above may be continu d (ex ept chlorid)

3 Dihydrotachysterol N N D (Hyt kerol®) ½ 1 cc d ily or 3 t mes w ekly to maintain blood cal i m at normal level

4 Cal iferol U S P 1 5 mg d ily In me as s up to 7 or 8 mg calciferol da ly may be s bstituted for dihydro ta hysterol Vitamin D action i probably similar to that of dihyd otachyst rol and it can ertainly be substit ted ade quately linically The init al action of vitamin D appears to be slower However the cost to the patient is less than using dihydrotachysterol and th margin of safety is prob ably greater Regulat the dose by daily S lkowitch test which should run 1 2+

5 In some patients Probenecid N N D (Ben mid®) in d ses of 2 4 Gm (30 60 gr) daily ha b n shown to block the tubular reabso ption of phosphat and hen e to lowe serum

T atme t

A Sp if c Th apy (Chro ic Cas s)

1 Co tis or hyd oco tisone Th drugs of choic at p esent Most Addisonian pati nts a e well maintained on 6 25 25 mg (1/10 3/8 gr) daily g en in di id d do es 3 to 4 times da ly r lly On this dose m t of th m tabolic ab o maliti s co ted Most patient howe er do not btain suff cie t salt ret ning ffect a d requi e D O C A or fl d o o ti on supplem nt tion or tra di tary salt

2 Des xycorti osterone A etate U S P D oxycorton Ac tate B P (D O C A) This drug cont ols electrolyte bal an e and has n other signif ant met bolic ffect

I M dmin tration of D O C A may b us d i itially but is r rely n c a y Th us al dos for s ppl m t t on is 1 4 mg d ily When th respon e h s been ade q at (see bel w) chang to bu cal us

b Bu cal use of D O C A On t blet daily o at mo t 1 t bl t twic daily w ll gi e adequat s ppl m ntat on Th tablet is pl d b tw n he k and teeth a d allowed to di solve (s p 418)

Des xy ortiso e t imethyl etate 25 75 mg I M n e monthly may be ed inst d of D O C A (25 mg I M on e monthly b ut 1 mg D O C A in il per d y)

3 Fludro t so A t t N N D This n w d ug i ve y po t nt in i d i g odi m tention It i eff ti e o ally D g is 0 1 t 0 25 mg d ily o every th r day (s p 424)

CAUTION When ver us ng D O C A r fl droco t one void o e d ag Do not hav pati nt on low pot s ium di t wh n g ving thes d gs fo p tie t m y develop igns of pota s um defic en y

4 Sodium chl ride n larg d e (5 20 Gm daily) m y b sed to uppl m nt orti on in the bs n e of D O C A o flud o ortison

B Ge er l M as r

1 D et Give high c rb hydrat high p tein di ts Freque t mall f edi gs tend to b b tter tol at d than 3 la ge es

2 Avoid xp u e to i f tio and t t all inf ct ons imm d iately and vig rously

3 Methylt sto te o e 10 20 mg d ly orally or te t ter p opio te in o l 10 25 mg I M 3 tim s weekly i oft n helpf l for its protein anab lic ffe t and for th no pe if f li g of well b ing it indu es in th d bilit t d pati t

C iteri of Ad q t Ther py and Ove dos g

A Ad qu t Th py

1 R tur f bl d p essure to normal M y require p to 3 4 mo th w th adequ te the apy

2 Ma t nan e of normal fasting blood gar le el

3 R t n f plasma ele trolyt to no mal level

4 Weight gain (u u lly due to fl id)

5 Imp m t of appetite a d of ge eral strength

6 In rea in i of h art to mal

B Ov d sg Mu t be wat hed for and avoid d very ca ef lly sp ially in p ti nt with cardia r r nal ompli ation

1 Sign and symptoms of corti n ove dos ge (e p 423)

2 D velopment of d p d nt ed ma or c s ive w ight gain

OSTEOMALACIA (code No 200 7642)

Osteomalacia results from calcium deficiency due to any cause In adults these include vitamin D lack or resistance (rare) and sprue syndrome or pancreatic disease Chronic renal disease may also p oduce osteomalacia but mo e generally produces secondary hyperparathyroidism

Rickets (code No 010 764) is the childhood type due to inade quate intake of vitamin D Laboratory findings include a low or normal serum calcium or a low or normal serum phosphorus (except in renal disease where it may be elevated) and most characteris tically an elevated phosphatase

Treatment

A Specif c Therapy

1 Ri k ts V tamin D even in small doses is sp cific 2000 5000 units daily are adequate
2 Adult osteomalacia and Milkman s syndrome Vitamin D is specific but very large doses are necessary to overcome the abso ption defect Give until an effect is noted on blood cal ium Usual dose is 25 000 100 000 units daily Doses up to 300 000 units daily m y be necessary but if the doses are over 100 000 daily they must be used cautiously
3 Pancreatic insuff cien y (see p 289) Ad quate replace ment therapy is of paramount impo tance High cal ium in take and vitamin D 2000 10 000 unit daily ar also of value
4 Sprue syndrome Folic acid and vitamin B_{12} appear to be of val e (see p 226)
5 Som are forms of renal disease Treatment is aimed at the altered renal physiology

B G n ral Meas r s, High alcium diet and cal ium gl conate calcium lactat or calcium chloride 5 20 Gm (1 5 dr) daily

ADRENAL CORTEX

ADDISON S DISEASE (Adrenocortical Insufficiency)
(Due to Tuberculosis code No 860 123.x)
(Undetermined Cause code No 861 782)

A disease due to lack of secretion of adrenal cortex aused by tuberculous dest uction of the gland surgery or undetermined factors it is manifested by astheni anorexia and oth r GI dis turbances hypotension and pigmentat on usually b ownish of the skin and mucous m mbranes This pigmentation i mainly an ac centuation of already pigmented areas and a d p sition of pigment in skin creases

The laboratory finding includ a low blood sugar increas d ins lin sensitivity low blood sodium and chlo ide l vat d potas sium el vated N P N and a positiv water test There is a decrease of 17 ketosteroid and cort coster id excretion a d l ck of response to adrenocortic tropic horm ne in primary Addis n s disease

1 Ov rhyd t on Ov hydration us lly d to od um re te tio m y es lt in e ebr 1 dema (with un sc ouseness o o vuls ons) o p lmona y ed m Withhold od m a d fl id t mpo arily and tr at fo th conditi ns (s e p 15)
2 *Hypok lem a* Flac id par lys with l w s um K^+ u u lly o u ing on 2nd 4th days of t eatment m y b t eated w th K^+ salts (s p 15)
3 Hyp rpy ia This omplicat on ra e w th p ese t tr t me t m th ds (S e p 27 for ther py)
4 For oth r ompli t o s of dr al st ro d th apy (e g psych ti re t o s) s p 4 6

CUSHING S SYNDROME (Adrenocortical Hyperfunctio i) (Pituitary Basophilism code No 841 7763) (Adrenocortical Hyperfunctio code No 861 7813)

A ch mc and if unt ted a usu lly f tal d as d e to hyperf tion of the ad enal o t x us d by primary hyperpl si o t mo o d t ad nal hyperpl s a e d y to nte p tui tary hyperfun t on The und lying phys ologi l d st rb nc p bably n ove ec et n f th catabol (gluc e genic ort sone lik) s r t on f the adr nal o t x It s m nife ted by sth a we ght gain e sy b uisab l ty abno mal fat deposit n ab t f e e k d t unk osteopo hyp rt on bdomin l stria sexu l dy t phy (n no h a w th mild vi il m in f m le and test lar t phy n m l) and in ulin r ista t d abet Th e is an e cess v e r tion of ina y 11 oxyst oids and at t mes f the 17 k to te o d F il e f fl d o t n Δ flud oc ti o e t s ppr 11 oxyst o dex et m y b a y r liabl diagno tic t st P l o t p t l g fflat on may r al t mo wh ch m y b r mo d rg lly Th o oph l unt is low lly b l w 50/ mm

<u>Tr tm t</u>

S c the ad t f th ti on th t tm t of th e i d e s h b alt ed de ably P g is h s b om m h mo e f o bl

A <u>Sp ifi Th r py</u>

1 S g l moval of th tumo or tot l or s bt t l e ection of b th adr l i th s f diff s bilate al hype pla ia is th p s t t tm nt of ho c Adequat p op ative medi at o nd of tmost imp t e The patient ho ld e v ll g n ral m su s li ted b low plus ad quat ho m al suppl m tatio

In s of nilate l t mo wh e s gery i i dic ted p ope ativ pr parat n with orticot pin (ACTH) h ld b ri d o t a w ll a c tis e th rapy as fo bilat l ad l ctomy (s b low) Th ACTH stimu l t th on tum o s ad nal c t x which i g n rally t ophied T e tm t with d c a ing do s f ACTH hould be onti d postop ratively fo 7 14 days

b If bil t l dre l tomy is co t mpl t d gi high do e f th ti g o tiso e 100 300 mg o ally a w ll a 100 300 mg I M f 3 5 d y p perati ly

3 Development of hypertension
4 Increase of diameter of heart above normal
5 Development of signs of potassium deficiency (weakness followed by loss of muscle power and finally paralys s) especially if patient is on a low potassium diet

Treatment of Adr nal C isis (Acute Adrenal Insufficiency)
The adrenal crisis is an emergency The pat ent must be treated vigorously and observed constantly until well out of danger *Overtreat rather than undertreat*

A S v e Crisis
1 Emergency treatm nt
a Anti shock measures Use appropriate adjuncti m as ures (*see p 27*) especially plasma vasopressor dr gs and oxygen Do not use narcotics or sedatives
b Hydrocortisone Administer hydrocortisone hemisuc i nate (Solu Cortef®) 100 mg dissolved in 2 10 cc water I V over about 1 mi ute Follow with hydrocortisone free alcohol (Inf sion Concentrate Hydrocortone® Cortef Ste il solution) or Solu Cortef® 100 mg in 1 L 5% glucose in physiological saline solution by I V infusio over a period of 2 to 8 hours If Solu Cortef® is not available initially administer the hydrocortiso e free alcohol 100 mg in 1 L of 5% glu ose in physiologi al saline I V over a period of 1 t 3 hours An additional 50 100 *mg* of hydro ortisone may be added to subsequent infusions d ring the first 24 hours if ne essary (*If* parenteral hydrocortisone is not available give aqueous adre al cortical extract 25 50 cc I V immediately and follow with 100 200 c aqueous ad enal cortical ex tra t in 1000 cc saline dextrose nfusi n)
c Cortisone a etat Give initial cortisone acetat 10 25 *mg* I *M* *in four different sites* (t tal 40 100 mg) Follow with single inject ons of corti one 25 50 mg I M every 6 hou s and gradually lengthen intervals of admin i tration to 25 mg every 8 hours
d S bsequent par nteral fluid Aft r the first I V inf sion mentioned above is completed t sho ld be follow d im med at ly by 1000 c 10% glucose in physiological saline solution (including addit onal hyd oco tisone as mentioned above) The total fluids in th f rst 24 ho rs and daily thereafte should not be g eater than 3 liters in ord r to avo d ex essive administration of odi m
e Ant infective measures If infection is pres nt tre t intensively with indic ted ntibioti
2 Convales ent treatment When pat nt is able to take food by mo th plac on ral corti one 12 5 25 mg every 6 hours and reduce dos ge to mainten n e levels as n eded

B Moderat Cr s s If th patient s physical ondition does not appear to b cr t cal and is not associ ted with a signifi ant degree of shock the treatm nt outl n d above may be modified by appro riate reduction in do age How v it i ge erally best to overtre t the p tient in mod rate risis du ing the first 24 hours rather than isk unde treatment

C Compl tions Arising During Co r e of Treatment f Cr is

MALE HYPOGONADISM

Eti logy

Failure of the g nad may esult f om s veral causes This failu e may be p imary (du to t ti ula disease) or second ary to malfun tion of other gl nds most often the pituita y or thy id

Di gno s

Th physiologic l diagnosis of th tiology of hypog n dism (e g prim y o sec da y) is u ually ba ed on l borato y tests

Type of Hypogonadism	U inary 17 K tost ids	U inary Gonadotropins
P m y	Low o norm l	El vat d
S condary Pituitary	Usually low b t m y b n mal	Very low
Ano xia N rv a	Low o norm l	L w n rm l Not g ally as low as p tuita y type
Thy d (T ti y?)	L w o n rm l	Low

Ma y lin l synd om s hav be n d s ibed but b sically they all fall into on of two at go i s Th diff enc re o t li ed below

A P pub tal Typ *Sh uld not be diagnosed before 18 years of ag* Th i a fa l of d v lopm nt f n rmal t t la funct nd i m nifest d by sm ll o bs nt t l mall pem lack or dimin tion of xilla y a d pubic hai la k of mu la developm t oft n young bo g tha hronologi l g Som of the p ti ts (g tho w th Klin f lt ynd m) h v be n how to h v f m l s ch m t patt

B P tp b tal Type Lo c t on of ormal t t c la funct on (gi al traum ti inf t on x y a d mal lima te) Appa tly the norm l ces t of testi u la fun tion the m le s not gene ally as ac te a d t nd to m h l t in lif tha th tion of ova ian fun ti the f m l H w e i om m n th may b a r the r pid tio f fun tio with the d lopm nt of ympt ms a in f m l m op (p 388)

T tment

T st t o e (th m l x ho mon) i the drug u ed f r r pla m t th py in th m l (Fo p paratio s vailable s e p 420)

A P p b t l Hypogo adism Adequat t stost e th rapy can

continue the I M and possibly the oral dosage during and after surgery After surgery gradually decre se the dos and maintain the patient as a chronic addi onia patie t (see p 381) Because of danger of precipitat ng heart fail re care must be exercised to avoid exc ssive fluids and sodium

2 X rav therapv to the pituitary may be of val e only i ra e cases of hyperplasia

B Ge er l Mea res

1 Diet High protein d.et should be given although dietary attempts to correct the negative nitrog n balance are doomed to failure

2 Hormones

a Testosterone has been f value in reversing the negati e nitrogen balance For this testosterone propio ate in oil 25 50 mg daily I M has been found nece sary

b In ul n s usually of little or no alue in controlling the gly o u ia and hyperglycemia Insulin is usually un necessary as the diabetes is quite mild

VIRILIZING DI"EASES OF FEMALES
(Due to Tumor code No 8041)

In the adult th virilizing or masculinizing dis se is sually caused by a tumor arising in the adrenal ovary or from cell rests of one of tl e above tissues it is characterized by excessive hirsut sm (e p cially of male type) amenor h a enlargem nt of clitoris de pening of voi e excessive mu c lature and excess ve 17 ketostr ro d excretion Surgical removal of the tumor is the treatm nt of choice

Another form of th d s ase b gins in childhood It is d e to over production of androg n type hormones from bilaterally hyper functioning adr nal cortic s In many of these pat e ts there may be asso iated manifestations of hypoadrenocort cism (i e exc ss ive salt and wat r loss and failure to maintain a fasting blood sugar) Treatment with co ticoids has p oved valuable in educing th activ ity of the glands (ppare tly thro gh upp ession of nd genous ACTH) and in supplying xog nously e ded cort c ids In adults the drugs of choic app a to be prednisone or prednisolone i d ses of 5 25 mg da ly orally in divided dose Some in estigators feel that the same d se of cortisone acetate by the I M oute may be more efficacious in this syndrome

Most cases of ex essive hirsutism n femal s are not due to *endocrine disease* but to her ditary o racial fa tors and should not and cannot be treated by any internal medi ations or su gery

HYPOGONADISM

Hypogonadism is d e to a failure of th sex glands to elaborate *sufficient* quantities of their hormones to bring about or maintain the appearance of secondary sexual characteristics

D gn

F llow g a omplete wo k up pe l test may be n c ry The s l o der f sp l d gno tic st p l as follow

A T st fo Estr gen P od t Adm te 10 25 mg prog te e l M d ly f fi e d ys 80 120 mg prog te one o thist o orally da ly for f d ys 125 250 mg Hyd oxy p gest o Cap t N N D (Delal t ®) I M on If bl d g oc s w thin 48 96 ho after th l st do of p o geste on or eth ste on o with n t n day afte hydro yp o g t o it i d ti of dog estr g p od ct If n bl ed g oc s t i dıc t t og lack r b ce of fun tio g domet um I th t se g estr g b l w

B T t F E trog La k Administe l mg d thyl t lbest l 0 1 mg th nyl st d ol daily fo 10 day

1 If bl eding oc s w thı 72 96 h u aft t on f th dr g it i d c tes th p s n e of pons v d metrı m but lack f ndogen est og n p od t o
2 If bl ding occ s w th strog n th r py only determ u inary gon dot p ns This p d re m y b do e b fo A (bov) if s ly av labl If n t p rform not one than 3 w ks after administrat on of t ge s
N mal 10 50 mo s unit /24 ho
U d 5 nit /24 ho prım y pit tary f ıl
Ov r 75 unit /24 h s p m y ova an f l

C Oth P d

1 Ba al body t mpe at ds vaginal m d do met i l bi psi a e ma nly of val when th e s a r po e t p g t o e t d t m wh th o lat n and th y l (t og p geste o) p tt n o m l
2 E pl rato y l p tomy f l l dı g lill do bı
3 Det m n t f ex h om t p tt may be h lpful (e g mal patt n lled o g n i)

T tm t

Th a m of th rapy of m h a i not to a th pp an e of m n (x pt fo p y h l gı al easo) b t to ttempt to t p od t v fun t

A P m ry Am h (No P evi M t tion) *This should ot be dı gn s d f pati nt s und r 18 ye rs f age*
T tm nt f th ndıtı diff little f m c dary am n h Th s u ually d e to o ga path logy whi h sh uld b o ct d If d y xual cha act ristı s ha not d v loped e t oge s al e m y b of val

B S d y Am o h T atm t d pe ds on und lyı g ab m l phy ol gy

1 Sp ıfi m It i ot n ry to t at ll s f m no h a spe ially am o h a o i gula men es in young unm ied gı l o women Th will g rally be c m re t d aft m riag o f t p gna cy
a In ases with normal spo s to proge teron th ad mi i t ti f th ho m d ıng th l t 5 d y of h month rally o pa te ally (e p ge 423) w ll c t th am n hea
b In u sp n iv to proge t o
(1) With low urina y gonadotropi Altho gh gonad tro would appea to be of val e ctually th y a e

make these individuals into normal adult males in every way except that they cannot produce sperm These patients must be placed on testosterone and maintained for life on adequate doses of testosterone There is little evidence that any p tuitary sub stance or gonadotropin is of significant value in treating these patients (see pp 412 413)

1 Long acting testosterone preparations 200 500 mg I M every 2 4 weeks may be employed (see page 420)
2 Free testosterone pellet implantation in experienced hand is an excellent method The dosage is as foll ws 300 mg is th minimal but an effective dose Average is about 600 mg For maximum effect about 900 mg are implanted The pellets are implanted subcutaneo sly with a trocar or nto a pocket made by blunt dissect on Either the inf rio scapular area or anterior th gh area s used Testosterone pellets remain and are effective for 3 4 months and then must be replaced
3 An alternati e method s the oral or sublingual administra tion of the d ug to the patient and entails all the difficulties of *prolong d o al administrati n Dosage varies* w th var ous individuals but 10 25 mg d ily orally is us ally ad quate dosage to caus maturat on and viril zat on and m in tenance of this state E idence now di ates that *there is* no advantage of buccal over oral admini tration

B Postpuberial Oral use of m thyltestosterone is probably the method of choi The dosage n essary to ontrol symptoms and to aid in overcoming the protein los and d bility of age s often as low as 5 20 mg daily This dose may be used for a short period of time to ontrol symptoms or may be continu d indefinitely for control of symptoms and for ts *protein an bol c* effe t Th long acting t stost r n s by nj t on m y also b employ d

FEMALE HYPOGONADISM

The mo t common symptom of female hypogonad sm *is ame* o rhea Howev r most cas of lat ve am nor hea a e not due to hypogonadism

AMENORRHEA (code No 761)

Et ology

Normal menst uat on d pends on many f ct s F om th *f nct* onal point of vi w there must b an intact pituit y gonado uterin x s Any br ak n th ycle of produ tio f the rious pituitary or ova i n hormones onc rn d w th normal menstruat on *or the lack of an* endometrium capabl of respon e to ova ia ho *mones* will result in amenorrhea Treatment is b s d in g eat *measure on the* l vel at which the dist bed physiol gy exists

a If pati nt has regular period she probably is manufac turing suff c t estrog and does not n ed th rapy
b If cycl are very irregula and the patient suff rs f om m nopausal symptoms t ogens given in cy li al fa hion may be helpful Begin estrogens about 5 d ys afte onset of last menstrual period and ontinue in a cy lic fa hion Ethinyl Estradiol U S P 0 05 mg o Di thylstilbestrol U S P Stilboe t l B P 0 5 mg by mouth daily exc pt for the fi st 5 day of e ch month This is imple for patients to rem mber
c If patient has b com am no h l there is no reas n to give troge in do la ge enough to reinstitute menses b t only to cont l symptom
d Duration f therapy Th ha not been standard d and m st b adjust d to the individual ca Thr months to 1 y r usually suff ces
Maint na dos for lif Be au of the anaboli ffect of estrog a d b use of th r known beneficial eff t on cal ium m tabolism trogen th rapy ha b n recom m nded f r the d rati n of lif fo women beyond th menop use The advisab lity of this p ti e r mains un s ttled
If a pati nt i on long term t og n therapy sh should ke p an ac t record of h dosag bedul a d bl ding Wh never bleeding occ rs that is not on sch dule (d ring w thdrawal pha) an inv tigation f tumor hould be in tit ted V ginal cytologi al examina tion hould b rri d o t routin ly v ry 6 m ths or 1 y

2 P y hologi l spe t M y of the ymptom of th meno paus are undo bt dly p y hologi al Th most ommon symptom i nxi ty more s v emotional disorde s may occu
a S dation Ph obarb tal U S P Ph nobarb tone B P 15 mg (1/4 gr) t i d q i d
b P y hoth rapy Simpl xplanation and re s ran e that th liv n d n t b hanged be a s of th menopause a ad quat in m st patient In th m e ev re cas s howev th a d of p y hiatrist m y prove sary

B S gi l nd X ray M opa Th s s diffe from the nat ral m pa only in th b uptness and verity of the sympt m both phy i l gi al and p ych l gi al In these p ti nt it i advisable t help th pati nt liv as n rmal a life as po bl If th pati nt an be mad to hav normal periods and if th y und tand that thei m trual y l will go on un ha ged th y usually mak tabl adjustments Estrogen th rapy i a f natural menopaus (above)

Compli tions of Postm nopaus l Hypogonadi m nd Tr tment

A Ost poro (p 379)
B Se il V ginit G v Di thyl tilbe t ol U S P Stilboe trol B P 0 1 0 5 mg o oth tr gen (s p g 422) daily ally Stilbe t ol vaginal upposito i co taini g 1 mg may be used daily f 10 t 14 days while continui g oral tilbestrol

not (see p 413) Employ estrogen alone or in com bination with progesteron (see p 422)

(2) With high urinary gonadotropins Gonadotropins are likewise of no value treat as above

2 General measures

a Adequate *diet and dietary treatment as needed to corre t* abnormal deviation of weight

b Psychotherapy in cases of emotional disturbances

c Correction of anemia (see p 219)

d Correction of any other metabolic abnormality (g hypothyroidism)

MENOPAUSE

Etiology

Failure of the ovaries with cessation of menstruation may result from several auses most commonly the natural menopause and menopause due to s rgical removal or x ray Failure may be sec onda y to malfun tion of other glands usually pituitary o thyro d

A Menopausal Syndrome (code No 805)

B Artif cial Menopaus Due to Roentgen Rays (code No 788 471)

C Hypofunction of Ovary Due to Unknown Cause (code No 788 x10)

D agnosi

Th menopause is d e to a loss of ovarian function and is man fested by vasomotor d sturbances (e g hot flashes) nervou ness emotional instability and am norrhea Abnormal ut rine bleeding may occur in the natu al menopause before amenorrhea s ts in

T eatm nt

A Natu al M opa se The menopause in the female s hara ter ized by at least 2 important factors *physiological* failure of ov rian fun ti n whi h oc urs rath r rapidly n the fem l and *psychological* recognition of the fa t that r prod ct ve life is at an nd Many believ tt t a a es lt of this th re is a marked change of life n impli atio that in addition t cessation of rep odu tive funct on th r i omplete alte at on in one s way of lif sexual act v ties pe sonal i te relation ships etc *This latter belief is ntirely erroneous* Most wom n go th ough the menopau with ut any difficulty in fact witho t symptoms Howeve in th se having ymptoms *one must* carefully evaluat the r le of th phy i logic l and psychological fa tors befo e beginning any the py Mo t cases will have a mixture of physiological nd p y hological facto s

1 Physiologi al aspects (estrog n th rapy) The e are c tain symptoms that s em undoubtedly to b due to the c s ation of ovari n fun tion the most p omi ent being vasomot r in stability (g fl hing) Anoth r may be the f ling of tension especi lly f llness in the head In wom n who suffer primarily from symptoms of c s ation of ovar a function *use of es rogens* is ind cated The dosag and m thod of ad *ministration* used depends on wheth or not the pat nt is still menstruating

Th l no evidence that s pervi d ap d w ight loss is harmful It ha been h wn that w th d quat protein i t k n t g n b lanc an b m nt in d n 350 450 C lori p r d y In these mark dly str cted d ets keton a may ppea t i sually v ry slight after th f t f w days how ev nd a d h ne r b n ob rv d In addition sinc th patients al th y a on a diet th y oft n will adh m e willi gly whe they h w p d w ght loss than when th It m t b l w in app a ng

2 Prot in A p ote n intak of at l ast 1 Gm /Kg (0 45 Gm / lb) should b mai t i ed If it i n e y to dd p otein to th low calo d t p t in hyd olysat o casein that re f e of ca bohyd at and f t an b us d

3 CHO a d f t To keep th calo es nd ket sis down fats d sed Aft r th p t n r q eme ts h b m t m st f th em i i g d et l ppl d f m CHO

4 V tam s and m al Mo t d g di ts e likely to be d f c ti it m ns b t ad q te in mi e l Th f t mins ho ld b d to pply th ag da ly ma nte eq m t d i g th t m of w ght ed t

5 Sod um t i t on It has be n sh wn th t a no mal person o a s lt f d t will lo f om 5 6 lbs (2 3 Kg) of we ght thus d t n i t mpo y and th w ight w ll r t rn wh s lt s dd d to th d t Th sam s t f th ob e p t nt nd altho gh an pp tly d mat ffe t n b obtain d with lt f d et it is of no p manent val e

B M d n

1 T d th pp tit Amph t mi S lfat U S P (dl amph tami lf t mi amph t m lf t B d in) d D xt o Amph t min S lfat U S P (d amph t mi lf t D ed i ®) ha p d f im me l d g p tl t on ed c g gm by d r a g th pp t t d g g a e f w ll b i g l p p do it ely t ind at d pt n rd s l di p i lly hyp t d n th p t t wh m the d g p d C N S t m lat B f t C N S t m l t g ff t s b t to a d g in m by t gi g th d g in the g Th d g allv gi tw a d y th morn g d a ly ft oo 1/2 h b f b kf t nd l n h Do g B d ® 5 10 mg (1/12 1/6 g) b d De d ® 2 5 5 mg (1/24 1/12 g) b d

2 D g t pe d up m t bol m *Th re is o att f c tory drug to p ed up m tabolism*

Thy id Thy d ha littl no pla e the m nag m nt of ob ty Th l w B M R found a oc at d w th b ty m ly a tef t d by th f ct that B M R i m m nt of xyg n o mpt on in t ms f body rfa a Th body s f a of b pati t i in s d b t th in s is d to lat v ly poo oxyg o m nam ly f tty tiss e rath than th oth m re t v tis d he a ppa tly low B M R re ults Act lly th ba l al i qui m ts of an ob indiv dual re gr t than th y would b if th s me ind vidual w f n rmal

MENORRHAGIA (code No 785 x20)
FUNCTIONAL UTERINE BLEEDING

With the gradual failure of ovarian function excessive bleeding at the time of the menses is common *This is d e to prolonged hypoestrogenic effect without concomitant proges erone prod ction*

Another type of functional uterine b eed ng which occurs most commonly in young women is d e to a hyperesterogenic effect In any case of prolonged and unusual ble ding s s ect and rule out neoplasms of the uteru

Treatment consists of ad ninistration of prog steron 100 mg orally or 10 1 mg I M daily for 5 days or 125 250 mg Hydroxy progesterone Caproate N N D (Delalutin®) I M *onc* This con verts the proliferati e endom trium nto a *secreto y o e* with com pl te shedding when the progesterone s wit drawn

OBESITY (code No 007)
(Due to Excess Food code No 010 70x)
(Undetermined Cause code No 010 70y)

Obesity may be defined s an nc e e n weight of over 10% above normal due to g ne al ed *leposition of fat* in the body

Normal we ght s diffi ult to det rmine *for aver ge* clinical practic how ver normal *as def* ned by th sta dard age he ght and weight tables is *satisfacto* y (see ns de ba k flyl af)

From a metabol c point of view all obesity has a common cause ntak of nor *calories* than are *required for* nergy metabo lism Th reasons fo differences n the energy utilizations of variou individuals whereby that on p rson can utili e his calori s *more* eff iently than anoth r is *unknown* Alth ugh most ases of obesity are due to s nple overeat ng a *few endocrine* disorders l ad to spe if c types of obes ty (*e g* Cushing s syndrome and hypothalami lesions) but th *se ond t* ons are r e Hypothyroid ism *on* the other hand is not nec s rily sso iated with obes ty

<u>Treatment</u>

Specifi we ght ducing chemi al *agents* and hormon s singly or n *combination* re either i ff ct ve o hazard s and have no plac in th tre tment of exoge o s ob sity

A <u>Diet</u> (see p 58) D et s the most mportant facto n th man agement *of obes ty* Ther ar a numbe of points to *consider*

1 Calor es In o d r to los w ight t is n ce ary *to decreas the* intake to b low th *calori eq ir* me ts of the ind v dual (see p 47) One ca determine a very approxim te average weight *loss per da* w th a given di t by the following formula

$$\frac{\text{Approximat Caloric Req i m nt Per Day} - \text{Numb r of Calories in Di t}}{4000} = \text{We ght Loss in lbs /Day}$$

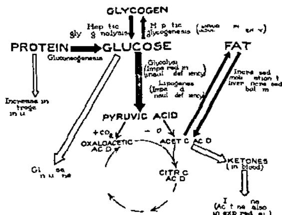
The number of *alories p* r day to p escribe for a pati nt va ies w th age *or* upati n temperament nd th u gency of the need *for* weight reduction A da ly calo ic *intak* o 800 1200 Calories i s ti fa tory *ing di t*

the adm nistration of insulin Altho gh failure of th islet c lls of the pa r to manuf ture suffici t ins lin to supply the endog e us *demands of the body is an imp rt nt f ctor this is not the* only fa to in clinic l diabetes Th best evidence for this is th small insulin requirem t of totally depancreatized huma s as om par d with th insulin req ements of pati nt with spont neo sly occu ring diab tes

P thol gi l Physiology

Th p im metaboli def t in di betes appea s to be an in bility to m taboliz glucos p operly How v thi def t has a ma k d s ond ry infl nce o p otein a d fat metaboli m Th compl d turb d metabolism can best be shown by ove s mplif d d agrams Th ketch on p 392 how th o mal interrelationship The pr sum d s t f action of i sulin is ind at d

Howev in diabet since insulin i dimini h d o ab ent othe metabolic pathw ys all of them cat bolic tak pr c d c The following diagr m hows the r lation hip in diabet s



Abnormal Glu e M tabolism in U cont lled Diabetes (R p o d d with p mi i n f om Harpe R vi w of Phy iologi al Ch m try 6th Edit 1957 Lang M di al P bl tion L s Alto Cal f rnia)

F om th bov diagram it an b se n that as th result of im pai d gl os oxidation the foll wing majo metaboli lt ratio hav oc d

1 Gl o is l t into th urin diminishing th body to of bohyd t

weight for fat tissues have a definite but slow metabolism It has been shown that obese people with low B M R s can tolerate 0 2 Gm (3 gr) or more of thyroid per day without change in B M R Prolonged administration of thyroid may suppress the patient s normal thyroid secretion

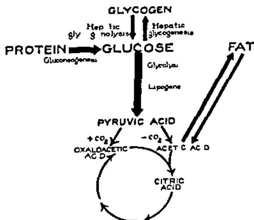
b *Dinitrophenol must never be given to any patient* It is a toxic drug that may cause blindness or even death

C E ercise Although exercise increases the energy output extreme exercise is necessary to significantly alter weight Playing 18 holes of golf for instance raises the total caloric requirements only by about 100 150 Calories In addition exercise tends to increase the appetite and m y make it more difficult to control the diet properly

D Psychological Factors Overeating is largely a matter of habit and in some cas m y be associated with deep underlying neurosis Whatever the cause the patients m st be retrained in their eating habits and educated to und rstand that on e their weight is normal they can easily becom obese again by eating more than their normal caloric needs

DIABETES MELLITUS (code No 871 785)

D abetes m llitus in man is a metabolic disord r of unkn wn etiology the metabolic defect of which ppears to be corrected by



Normal Interrelationship in Glucose Metabolism

I Ii

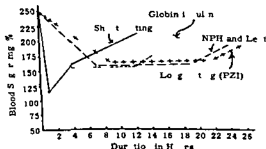
Ins lin is tili ed clinically to enhanc carbohydrate oxidati n This i m asured lun ally by noting the lowering of the blood s ga or the l s nl g o d sappearan e of glycosuria

A Duratio of Act   d I s lin P p rati n   Th   a e 3 main type of i ulin   iiable

1 Sho t acting insulin   Ins lin Inje tion U S P   B P
   R gula ins lin
   b Cryst lline zinc i   ulin
   (F r clinical purposes th   actions of thes 2 insuli s a id t cal Crystallin   in insulin i p f   d only because of its g e te p rity) Th s a   u ful mainly in controlling postpra dial blood s gar elevations

2 Long acting insuli   Prot mi e Zin Insul n Inj ction U S P B P   This   usef l f   l wering the mild r hyp glycemia which i pre nt duri g th   maind   of the time between m als

3 Intermed at   a ting insul n
   Isophan Insuli I ; tion U S P (NPH) A stabl mi ture with p op ti   m h lik a 2 1 mi t   a d ha te d d to r pl   e PZI in the management of mo t di betic patie ts   It may al   be tallo d to fit th patie t   by addition of app opri te   m unts of   egula insulin
   b L nte I ulin N N D   M d by a tio of z c o in   lin nd   p i 1 c dit ons (protamin f   and phosphat fr e)   A tion is alm   t ide ti l with th t of NPH i   ulin Globi I   l n with Zin   U S P   This insuli is s mil i action to 2 i in ulin mi t   pt that ts d   at   of eff t s ot a p lo ged   It   f l in many diabet patie t   b t it c nn t be mix d with ho t acting i   uli
   d I termedi te insulin   See p g 398



Exte t and Duration of Action of Various Insulins
(i   a Fasting Diabetic)

2 Liver glycogen stores become depleted in supplying glu ose to the body
3 Protein stores begin to break down at an exc ssi e rate to supply glucos (gluconeogenesis)
4 Fat mobilization to the liver and catabolism a e increased
5 The excess ac tate formed cannot be imm diately utiliz d and conde ses to give rise to ketone bodies (β-hydroxy butyric acid and acetoacetic acid)
6 As a result of increased ketone body formation and the r slow utilization ketone bodies accumulate in the blood and spill over into the urine Since these subst nces are ac d they are excr ted in the urine joined to fixed base (Na^+ K^+ Ca^{++} etc) The accumulation of acid ions and loss of fix d base res lt in the cond tion known as acidos s

Diagnosis

The typical clini al feat res in untreated diabetes m llitu are polyd psia polyphagia polyuria and weight loss b t these oc ur only in the mor severe forms of the disease B c use of the varied and nonspe ific symptomatology of the disease th actual d agnosis of diabetes rests upon laboratory eviden e It should be emphasiz d that all labo at ry tests fo diabetes are non pecif c and abnormalities of one or all may occur in other diseases (e g hype thyro dism liv dis se) Howeve i the baence of oth r diseases glycosuria and hyperglycemia are diagnosti

A Glycosu ia The presen e of red ing s bstances identified as gluco in th ur n is xcellent pre umptive evidence
B Hype glyc mia Th finding of an elevat d fasting blood sugar and/o ab o mal blood sugar level 2 hou s after a m l con taining 100 grams of c bohydrat o a dose of 100 g ams of glucose is almost d agno tic in the absen of other diseas s This test sho ild be p form d however only after the pat ent has be on a high a bohydrate di t for t least 48 ho rs It is well known that th previo s d et influen es ca bohydrat t lerance A high fat d et will decre se tolerance (giv diabetic typ curv even in norm ls) and a high c bohyd ate diet will incr ase toleran e
C Interpret t n of Blood Sugar T sts A normal f sting blood sugar do s not r l o t d abetes If the 2 hour postp a dial bl od s gar level s over 140 one can b ea o ably ce tain that th cond t on di b tes If th blood gar level is be tw en 90 and 140 t is n ess y to perf rm a glu os tol r nce te t to establish th di gno is

TREATMENT OF DIABETES MELLITUS

In orde to treat patients with diab t s it is nec ssary that o e b thor ughly f miliar w th the following

1 Insulin (probably of gr atest impo ta e)
2 Diet
3 Influence of exe cise
4 Prompt tr tme t of c mpli ati n et
5 Newer agents effecti e against diabet nell t T lb ta mide (Ori ase®)

2 Syring In orde to aid pati nts syringes are available librated in units (U) rathe than cubic centim ters Many of th e syring s hav 2 calibrations (U20 U40 or U40 U80) and it is impo tant to have the patient th oughly understand which sc le h is ing It is advis ble however to m pl y a syringe having on calibration only Spe ial syr nges s vailabl for blind di bet c patients

3 Sites of injection In ulin is u ually administe ed s bcutane o sly The sit of inj ction s generally the anterior thigh b t insulin m y al o be given in th lat l thigh in th arms or a t or abdom or in un sual ci cum ta sub c ta eously in a oth pa t of the body It i import nt that th s t s be on t tly chang d so that the same site i not inj ted mo often than o e ev ry 2 3 w eks Crystallin a d gular i ulin may be administered I V to patie ts who h e been taking insul n with ut allergi ea ti n *Do not give PZI NPH or lente insulin intravenously*

Di t i D bet

The n triti nal n eds f the di b t patient are not significantly diff rent from thos of norm l individual Th princ pal q st on to be s ttl d is the qua tity and typ of bohyd t to be ll w d in the di t (Fo det l d food ha ts in mak g up d ts s pp 46 53 and for xamples of diabeti diet s p 57)

N t When ver p s bl diab t d ets sho ld b m d p in term of h us hold m su m nts th than w ght for Ini ally th ext a a ra y gain d by w ghing s g ally unnec ss ry

Th following f to s m t b tak n into con id ration in esti m ting th di t

A C lo ic N ds (See p 47) The alo ic eds of th di beti ar tim t d as fo non diab t individual and th sam var ables m t b o id ed In gen l one h uld mem be that th diabeti p ti t should b kept t normal or slightly s b m l w ght l v l nd ev p rmitt d to be ome obe e

B P t i . P t in mu t be ad quat and high p otel diet are d si bl be su th avail bl gl co (58%) fr m protein is r l a d m e lowly fo tili tion than ingest d carbohydrat At l a t l Gm of p t in per Kg (0 45 Gm /lb) of body weight hould b giv n alth gh 1½ 2 Gm /Kg (0 7 0 9 Gm /lb) re p f ble

C Ca bohydrat C bohydrate sh uld not be given in o tr t d f m P f c hould b given to 5% nd 10% f uit a d v getabl the e tak longe to dig t and d o b and l ss v i bl bl od ga l vel i obtain d Th q tion of ad quat ve t t d rbohydrate in th d t is till unset tl d In g r l the vi w s tak n that in th diabeti the aim to k p th individual clos to phy iological normal s po bl nd h to k ep his rbohyd t at pproxim t ly normal l v l d to admini t in ulin if nec s ry to on t ol a y re lt g hyp gly mia and gly s ia In g neral th f 2 3 Gm of c bohydrat per Kg (0 9 1 4 Gm /lb) of body w ight i re omm nd d t th sta t of t tme t if pati nt t l inc se with t tme t gradually in c b hydrat to 4 Gm per Kg (1 8 Gm /lb) of body w ight This i a gen ral rul a d in s m mild diabeti s it

B I s lin Mi t res. Intermediate insulin may be prepared by m x ing a short acting or intermediate (commercial) and a long acting insulin (add last) in one syringe This gives a balance between the immediate and the prolonged effects by modifyi g the mixt res on can tailor the insul n req irements to in dividual needs The mixtures usually employed are 2 1 and 3 1 (crystallin zinc PZI) or 2 1 and 3 1 (NPH PZI)

1 *Points to remember in use of insulin mixtures*
   a Regular insulin must always be withdrawn into syringe before PZI (becaus of protamine excess in PZI)
   b Same unitage of regular ins lin and PZI must be used
   c *General effect of I/PZI mixtures* 1 1 largely PZI effect (little point to this mi ture) ? 1 intermed ate daytime ightitime effect 3 1 greater daytime effect
2 Application of tailored insulin mi tures
   a If glycosuria oc urs in all f actio al urines increase total insulin mixt res
   b If gly osuria occurs in fractional urines 1 and 2 only (daytim glycosuria) increase regular in ulin i mixture
   c If glycosu ia occurs in fractional urines 3 and 4 only (nightt me glycosuria) ncrease PZI in mixture

C Commercial insulin preparations come in various stre gths (u its/cc) in 5 and 10 cc ampules ide tified as follows

Pot ncy Preparation	Color of Rubber Stopper	Colo of Label
U20 U mod f ed regular	Yellow	Y llow
U20 C ystalline	Yellow	Gray and bl e o blu gray and yellow
U20 PZI	Not av ilabl	
U40 Unmodified reg la	Red	Red
U40 Crystalli	Red	Red and gray
U40 PZI	R d	Wh te lab l with red p inti g
U40 NPH	Red	Bl d whit
U40 Gl bi z nc	Red	R d d b own
U40 Lente	Red	G ay label with ed and black print g
U80 U m dif d eg la	Gre	Green
U80 Crystallin	Gre n	Green and g ay
U80 PZI	Gree	Whit lab l w th g en p i ti g
U80 NPH	G en	Bl a d wh te
U80 Glob n zi	G ee	G e n and brown
U80 Lente	Gree	G y label w th gre n nd bl k p i t g
U100 *Unmodif ed regular*	O ange	O *ange*

D Admi ist at on of In li

1 Sele tion of insulin prep ration In view of the large num b r o insulin preparations a ailabl the e is ofte g at confusion regardi g dosage The efo e it is n ess ry to place the pat ent on one type of insulin and ha e him be ome familiar with this type One use an i s lin of su h stre gth that the volume p r injection is kept t 0 25 to 0 5 cc Abo t 80% of patie ts are *able to us U40* i li

B Compl ting Fa to s A larg number of factors adv ly aff ct the c rs f th patient with diabetes All of th on d t s perate by altering the abs rption of glucos by int fer g with ca bohydr t oxidation by ausing excess v rb hyd t formation The most imp t nt of these facto s e infections especi lly those of pyog ni nature w th fev a d to emi Any infectio s erio s in a d ab tic fo it ompl tely ups t th quilibrium established by th apy I w ys i crea es the n d for i s lin nd is one of th mo t c mmon pre ipitating cau of k tosi d a ido is The fo e ny nd all inf t ons in th diabet c a to b av ided wh ne e pos ble wh n th y o ur th y m st b t ted promptly a d v go o ly Du ing sev re infect o s it ge er ally advi bl to di ont n PZI and to b gin th py in divid d do es 3 6 tim s daily with regula o crystall n in lin as n ed d t cove p tp dial glycos i

C G ral F t P t ts with diabetes should liv n ly rmal hygi nic lives a p sible Th y h ld b ass red of d quate st ho ld b abl to t t home if at all po sible and sho ld ngag in n o pation q i g at le st mod rat e is but m st av id st n ou o cupat ons of gr t t im p t n th y should hav good g n al kn wledge of diab tes

STEPS IN THE MANAGEMENT OF THE DIABETIC PATIENT

Th r e ma y d q at m thod f m n ging di beti Th followi g i plan u ed by th tho whi h f lt t b pra t al d phys l gi lly so d

STEP A – DIAGNOSTIC WORK-UP

1 C mplet hi tory nd phy l xaminat fo diagno i and to l t th p f y o xi t ng o mpli ting d ea
2 U inaly fo qual t tive s ga n m ni g f ting u n p m n a d sp im ll t d 2 3 h aft a h m l If ga p t h k f a t and dia t a id
3 Bl od s ga xamin t Fast g a d 2 ho p tp d al l vels d t m n d o if s a y a gl tol an e t t p f m d In ld ly patie ts in th p e of nal di it advi bl t p f m a gluc t l anc test with m lt in ga t det mine th appro m t n l th e h ld If thi i v y high (v 160 180 mg %) t may b n ess ry to e blood s ga l v l s a h k d qua y f th rapy rathe than th glyc ria

STEP B – CALCULATION AND ARRANGEMENT OF DIET (e p 57 f xampl of d ab t d t)

1 D t min th lo ic ds f th p t t This i th m f th n n di beti (p 47)
2 Cal ul t th p t in CHO and fat t t of th di t as outli d on pp 46 ff

may be advisable to keep the ca bohyd ate level down to a o d the use of insulin However both for physiologi al and for psychological reaso s the carbohydrate level should in no case be below 100 Gm per day

D Fat. After the carbohydrate and protein amounts have been determined fat is given to m ke up the r maining calor c re quirements

E Vitamins Patients with d abetes t nd to develop vitamin de ficiencies especially of the B complex Th easons are n t always clear b t may be due to inadequate food intake rest ic ted diets or increas d requirem nts o improp r utilization c vitamins Deficiencies on adeq ate diets a e rare If they occ treat as needed (see p 59)

F F q en y of Feed ng D abetics should be given small frequ feeding r ther than large meals By f equent f dings the use of high prote n intake a d less concent ated ca bohyd ate food one can maintain a lower nd mo e even blood sugar level with less gly osur a An excell nt plan s to d vid the f edings into six meals three regula meals a d thr e sm ll f edings (e g milk) at mid morning m d afternoon a d bed time

Tolb tamide N N D (O a)

An enco rag ng recent devel pme t n the t atme t of diabetes mellitus is the introduction of n o l g t tolbut m de (Or as effective against certain forms of the dise e Tolb tam de s a lfo am d d r v tive ltho gh t has no antib teri l p pertie It appar t m d of action is to stimulat the p d ct o of n ul by the bet ll of a pancreas wh h would ot othe wis p d c th hormone (la y pancr as) It does not pot nt ate th act o of in s l a d is of no val e nle the panc ea ap bl of e reti g i l n Therefore t lb tam d s of no use (and sh ld n t b tried) in ev diabet s (g) l set) o tho d abet patients who tend to dev lop k t s s ly Its o lv are f s f l n ss is in the olde p ti t with a m ld d g of di b te wh ch can not be controlled by diet lo e (i t ly m ld dult m t ty o s t nonketotic type)

Do age T lb tamid s pplied t bl t f 0 5 Gm G an ti l dose of 3 Gm daily n div ded do and d c e se rapidly to the min mal effective do e Th v rag m inte do i 0 5 1 5 Gm daily

Toxic re t on a a Sk n rash d g stroi t sti al distres occu nly ccasio lly Th hav been o po ted inst ces of g locyt penia f ll w g se of th d g b t thi may ccu a d should b b e n m d

Othe Fa to Infl e i g D b tes

A Exer se. Ex c nhanc s th oxidatı n of s gar h it dim ni he the ne d for in lin Th fo e exerc in m d r ation i ben f c al Howeve pati nts t king sul n should be ca t o d against strenuo x c s w tho t f rtifyı g them selv s p eviously with ext a carbohydr t (It s not un om mon to have a hypogly em c re tion after a set of t nis) When r gulat ng a pati nt h v him p rfo m app oximately the sam amount of xe c se as w ll b quired by hi no mal activit e Th s is t ue also of h spit l gulat d diab ti

tim of gly o ria on th p e edi g day d t rmines the re adjustment to be m de The gly o uria at a y t m must be k pt at a minim m i e o gr at th n g een red tion (or +) w th e zymati test p per m thod In any sp cimen In g eral especially w th lo ger acting ulins chang hould not be m de fr que tly mply beca se m ked insulin ct n oc a ion lly occu

a If all pecim e g een no dj tme t of do ge o ompo ition of i sulin i necessary

b If glycos ria (great than green red ti) occurs aft b akf st afte the noon m l the r gular i sulin is i cr d

If glyc u ia (gr te than g n d tion) o in the aft oon aft the ev ni g meal r b f e b kfa t the p ot min in insul i in eased

d If glyco ia (g at than gr d ct on) oc in all sp cim s both egular a d p ot min in in ulin a i ea d

Amount f in eas f in ul n will v y w th ea h pat t Ge erally a v ry o gh g id fo th in e of i sul n a follow

(1) Y ll w r d t n (or ++) Add p to 5 unit

(2) O ang d ctio (o +++) Add 5 10 un t

(3) B k ed d t on (o ++++) Add 10 15 its

f If the e s no gly (spe im emain bl) th pat t ho ld b q st o d fo vid c of hypogly m a and h ri o d d sh uld be exami ed Adj stment of d g m t b m d a o d c with th f di g

4 R djustm nt of the s of f edings If va iat on of th insulin dos ge nd compo ition d not maintain th gly o uria t a minimum for a giv n pe od the di tary intake f r the pre ding m l h uld b d ea d nd the intak fo oth meal in re d a lik amount

"_P D — FOLLO' –UP OF PATIEN'

Aft pati nt ha b n ad quat ly t oll d h ho ld b s n at regula nt rval rang d a n ed d to h ck f r a y hang in th p t t o in hi di b t stat s

1 Hyp gly m t ns Ca efully q t on pati t as to o n of any hyp glyc mi ct ons If th oc low sulin a o ding t tim of day th y tak plac

2 Examin pati nt s rine If all urine is ntirely fre of s ga the pati t cont oll d (if renal th hold n rmal) b ful of hypoglyc mic re cti s how v if all urine a bl ly in therapy I patient tol n e will im p v und th rapy Th i no ont indi tion to having om gre r d t ons (On th nt ry th r i s m vid that mod rat gly os ria pe s is not ha mful if the m taboli e d of th body are being fulfilled How ver it i sually best to k p adeq at ontrol ov r pati ts o th y t d t igno th ir di s e entirely) If ther is ma k d glycos ia in a y rin th insulin i adjust d a c dingly

3 W gh pati t F ll w pati t w ight to be su e that the w ight is i re sing d r ing remaining stationary a d sired If n t lte th di t a cordingly

3 Divide the diet into the following
   a Three medium sized meals It is advisable to space the meals as far apart as possible (i e an early breakfast and a late dinner) This will spread the absorption of glucose over a longer period of the day
   b Three small feedings to be taken between m als and at b dtime Milk and low CHO fruits are preferred fo this

STEP C – DETERMINE THE INSULIN REQUIREMENTS

1 Determination of amount of glycosuria Have patient eat his diabetic d et for 1 day preferably without change in activity For the next 24 hours he is to collect and label fractional urines as follows (Patient voids just befo e breakfast a d discards this sp cimen)
   a Urine No 1 All u ine voided from breakfast to just be fore lunch This is pooled and a few drops taken for qualitative sugar The remainder is saved
   b Urine No 2 All urine from lunch to just before dinner Pool and save as above
   c Urine No 3 All urine from dinner to j st before re tiring Pool and save as above
   d Urine No 4 All urine from retiring to j st befo e br ak fast Pool and save as above

   The few drops of each ndiv dual urine fra t on are analyzed qualitatively for suga and the remainder pool d for the daily total quant tative sugar

2 Calculation of app oximate insulin equirements from quantitative urin sugar det rminations Since ro ghly 1 unit of insulin will cover 2 Gm of glucose the insulin needs in the uncomplicated di beti can be calculated as *follows*

$$\frac{\text{Gm of Glucose in 24 hour U ine Spe im n}}{2} = \text{Approximate No of Units of Insulin Needed per 24 Hours}$$

The insulin (24 hour equir ment) is g n rally giv n as NPH or a a mixtur in a single do 1/2 hour before br akfast The usual m xtu es are 2 1 or 3 1 (rystalli zinc PZI) or NPH regular m xtu

   a In sev r or compl c t d diab tes be aus the patie t n eds insulin mmediately thes meas e cannot be performed (s e p 403)
   b High renal threshold In ce tain lde ly patients r those with r nal disease who have a high enal thr shold for sugar this m thod will be witho t valu Th s patients must be controlled by the dete mination of th blood sugar l vels while fasting and 1 ho r fter m ls In th se *c ses* begin with small dose of l ng acting insulin (5 10 *units*/day) and increa e as ind cat d by t sts

3 *Adjustment* of ins lin dosage and mixt re The patient con tinues to coll ct his u ine fract ons as outlined above and the do age and composition of the nsulin mixture i deter mined *ea h morning* after completing th qualitat v s gar *analysis* for the previous day Quantitative sugars are usually not necessary after the fi st d y Th amount and

2 Ep eph (adr al n) If pati t i well nou i hed pe ally if usi g sho t act g i s lin d l r is not de pl ted of glyc gen epineph ine 0 5 1 0 c (8 15 m) of 1 1000 ol tion bc t may ca s r t n of c scio n ss o that food m y b tak n by m th

3 R ct l fe ding If p tient is uncons o and I V gl c s is not available (a d if pin ph ine i e ther not ava lable or n t fea ibl or su ces ful) glu os by re tum m y b lif v ng Add 2 Tbsp of syrup or ho y t a pint of w rm w t d give slowly by r tum

C P ev nti of R laps When p tie ts taking p otamine zinc i lin dev l p t ons th y sh ld be efully watch d fo da ger of relapse High p ot in food s h as milk sho ld be giv n in addit on to carbohyd t

OTHER COMPLICATIONS OF INSULIN THERAPY

All gi Re t on

Fo tunat ly all gic r ct n ar v ry ra e nd mo t e tio s a e locali d Th s individuals ar ge rally s n it ve t po k p nc e s f om which bout 60% of o nm cial in ulin made (th r 40% f om b f) Thes p t nts h ld b given p be f in lin p pa at on (Sp ial Insulin) whi h s put p in 10 c ampules of U40 If pat nt is till s ns t e d e s tiz ti n me su es sho ld b t d (e p 112)

Lipoat phy

Thi a omplic t on c n st of at phy of b ut n ou fat at th t f inj t n Th may b ca s d by imp op ot t on of i j t o s t b t om as s ur in spit of a eful the py Th s pat t hould e U80 o U100 lin ot t j ti n s tes and m k inj t on at b dy s whi h cl th d t ll tim

COMPLICATIONS OF DIABETES

CHRONIC COMPLICATIONS

Th s t in dis s pro ss s th t te d to o c with g t f q n y in diabetic pat ents than i n n diab ti s nd a f w d t that a rathe typic lly o iated w th diabet Th y a m ton d h e i o d t c ll tte t n t them The th py i ge lly that f ad quate o t ol of th d bet s and th py of th xist ng o und rlying d ease The mo t ommon di e

A Art l o E pecially f the pe ph al a t ri f th l g Fo th rapy s p 208

B D b t c P iph ral N iti (S p 358)

C D bet O l Compl t o s In lud cat act wh h i t t d g ally and r t t f which no f rm f th py appe to be f any all

4 Draw blood for fasting blood sugar level to determin whether fasting hyperglycemia is being adequately controlled (This need not be done on every visit in fact it can be done quite infrequently once the patient is standardized)

COMPLICATIONS OF INSULIN THERAPY

HYPOGLYCEMIA (code No 574)

Hypoglycemia is the most common complication of insulin therapy and usually occurs when the diabetic fails to eat or engages in too strenuous exercise It is manifested by w akness hunger irritability faintness and tremors and convuls ons all of which are elieved promptly by the administration of gl cose If a diab tı p tient is seen unco scious and if diagnosis of coma or nsulin re action is impossible or in doubt give 50% glucose I V This will d finitely ov come the insulin reaction and will not gen rally harm the patient in diabetic acidosis

Propt ylaxis

A Gl co e Because of the danger of insulin react on the dia betic pat ent should carry several lumps of sugar o glu ose lozenges at all times If he feels the onset of a rea t on he should take some sugar

B Identific tion Ca d Every diab ti should carry a card with the following nformation

> *I AM A DIABETIC AND TAKE INSULIN*
>
> If I am behaving pe uliarly give me s ga or hard andy or orang ju ce slowly If I am unconsciou c ll a ambulance immediately take me to a physic an o a hos pital and notify my physic an *I am not intoxicated*
>
> My Name s_____________________________
>
> Add ess____________________________Tel phone____________
>
> Physi ian s Nam _____________________________
>
> Physicia s Address____________________Tel phone____________

Tr tmer

A M ld Hypoglyc mia If p tient is conscious d able to sw llow s gar glucose or o ange juic may be g v n

B Mode at to S vere Hypoglycem a *Do not attempt to feed patient if unconscious* If patient is unc ns ious one of thr e m thods may be used

1 I V glucose (t eatment of choic) 20 50 cc (5 12 d) of 50% gluco e I V slowly As soon as co sciousn ss is re stored oral fe ding may begin

Diagn si

Diab ti ac d s is manif sted by heada he i itab lity d ow sin hyp rpn a and fever Naus vomiting diarrh a and abdominal pain may lso b pr s nt Th swe tish fruity' ace to breath m y b d tected On physical xamination the skin and muc s m mb nes re u ally dry blood p essu e low eyeballs soft nd pul su lly pid nd th dy

Principl of Th rapy

Fo me ge y management ee b low

Th pru ple of th rapy wh th r th patie t p omato e o r in coma a e th sam It i imperative that a patie t in c do is be h pit l d nd t ated a medic l merg cy E h ca must be individuali ed

A I ulin n l g amounts i ne ary to b g about a r tu n to orm l metab li m *U e short-acting insulin never treat patients in coma with P.I NPH or lente insulin* Th fi t dose f i isulin should be 100 200 unit on h lf should be giv n I V and the oth half ub utaneo ly Insulin may lso b added t I V fluids b g admi ste ed Be us of th mode of a tion of in lin (ee p 393) ther is no ne d t p at ner than in l 2 hours Th d se may the b r peated sub t o I V gi g 50 75 u ts ev ry 1 2 ho s a need d until th keto iu begi to d pp If ho k s p es t th in lin h ld be gi e I V beca e of the unrel ble b sorpt n d ing sho k of mate ial g n s b utaneo sly

B Glu.ose. In diabetic a idosi on s t ati g the k tos and a dos s a d n t the hype glyc mia and gly s ia Altho gh th pati nt with ido i may h v a high blo d s gar l v l the total vailable c b hydrate st es m y actually b very low The for sin it s ne s ary t hav an adequate gl os pply pon whi h in lin n a t ir overcoming cido is th se p t t sho ld be give gl co wh the blo d suga l vel has begun to f ll r pidly It has b sh wn that k tos can b re d c d by giving v ry la ge amou t of gl co to di b tic pat nts who s e dep ived of insulin The oon th norm l m t boli pathways a e r stablished th soo r ess fat oxidati n c ses d k tonemia is over om In addit on it is po bl to p ipitat hyp gly mic e ction in a patient with l w s ga erv before th ket sis bro ght unde o t ol

C F u t se Inv rt S gar It ha be n shown that aft r I V infus o s f tos disappea from the blood st eam of diab tics s rap dly as it doe from o m is It has be n sugg ted th r f re that this s gar be s b titut d f gl o e in th t at m nt of d b ti s be u it s ut li ed in th bs e of insuli Howeve the is om videnc to show that in spite of its tili t on in the diabet it has no ant k t geni effect with t in ulin Until this c ti l q t is ettl d o sh uld ont n e t us gl cose and in ulin i the manag m nt of diabeti c dosis

D Fl id and El ct lyt

1 Fluids m st be gi n t repla e th s lost by diuresis a d vomiting Th se ar ually best given I V

2 Ad q t odium hloride is v ry importa t This repla s fixed bas in th xt a ellular fluid a d so h lps in ove oming th a ido is As a re ult of ketosis the los of

D R n l Complication Intercapillary glomerulosclerosis char acterized by hype tension albuminuria and edema Treat as for glomerulonephritis (see p 293)

ACUTE COMPLICATIONS OF DIABETES

When the amount of insulin in the body is inadequate for meta bolic needs abnormal metabolism results with ketone body forma tion and f nally with acidosis Infection which cau es an increas d demand for insulin usually prec pitates ketosis There is an early or mild phase and a late or severe one

A Diabeti ketosi With ut Ac do i CO_2 content or combining power is normal or slightly depressed (above 50 60 Vol % or 27 mEq)

B D beti A do is Reduction of CO_2 conte t or combining powe (below 50 Vol % or 27 mEq) The pati nt m y be con scious p e omatose or comatose

DIABETIC KETOSIS (Without Acidosis) (code No 543)

In this disorde keton bodie a e found in the urine and their presence establish s the di gnosis Examine the pat ent for inf tion or other p ecipitating f ctor Th fluid and ele trolyte b lances are und sturbed

Tr at nt

I atient sh uld be hospitali ed for regulation if k tosis is severe

A Treat any infe t on whi h may ggravat the disorder d met bo l sm

B Di t A rang diet to contain 3 equal f d ngs with interval f ed ngs b tw en e ch me l and in th evening

C I In

1 If ketos s is ve y ve e u e *only short-a ting insu l n* G v insul n to cov each meal as e essary until the u i e s f e f om keton bodi s Tt n b gin reducing in il n dosage slowly as tol r nc to arbohydrate impr v s

2 If keto s is not s v t at and egul te a n omplicated d bete

D Follow up Wh n ketonuria has le red pat nt s managed as for uncompli at d diab t s ac o ding to th s verity of his dise s (s e p 399)

DIABETIC ACIDOSIS (Diabetic Coma) (code No 542)

When k tone formation is p oceeding at a apid te the fluid and el ctrolyte balance and pH of th body r upset (ee b low) The k tone bod es are o gan c a ids which repla e th HCO_3 in the body and also are ex r ted from th body ombi ed w th fix d bas Th s *loss of fixed base* and the d sturbance of th buff ring systems leads to *acidosis* The in reas in th glu ose in th blood pro duces d resis of ne d d body *fluids*

insuli per gram of sugar (5 0 units ins lin per liter) and 20 mEq potassium and possibly phosphate The urin should c ntain sugar at all times to avoid hypo glycemic reactions

b As soon as repo ts ome f om laboratory if CO_2 com bining pow r is below 5 mEq /liter (10 Vol %) calcu late amount of sodium lactat o sodium b carbonate des red (s e p 15) and administer immediately (To ad minister sod um b arbonate I V m rely d s olve chemi ally pur sodium b arbonate in 00 300 cc cool dist lled wat r and administer *Do not heat or steri lize the solution*)

c Gastri lavage may be performed with introduction of 200 cc of physiological saline or 5% $NaHCO_3$

d As long as pati nt is un onscious administer 5% glu ose in saline or ther salt sol tion as indicated (about 60 drops per min te) S e p 405

e As soon as pat nt is conscious and able to swallow give fruit j e (200 cc orange juic w th 1 tablespoon honey syrup o glucose) every 3 4 hours until k tonuria has stopped Stop I V glucose a d fluids

B Follow up

1 P tass um d fic n y Aft 4 to 8 hou s of administration of I V fluids watch patient carefully for potassium d fic ncy (i e w kness resp ratory d st ess) a d che k the E g (s p 14) G e ol t ons ont in ng po ss um (s p 21) a ndicat d It m y b advi sable to b gin d minist tion of potassium as soon as th coma tr atm nt is begun b t th s still not settl d When pati t is able to swallow gi s pplementary potassium salts by mouth s thi s the safest route

2 Oral feedings a d fluid If ketonuria is di ppea ing or is rap dly improving (usually n 24-48 hours) and the patient is consciou the following may be given

a Small freq nt feedings of liquid and semi liqu d foods co t i ing 50 75 Gm glucos and protein (as *milk*) eve y 3 4 hou day a d night and cover with 5 35 units regular in ulin every 4 ho rs

b Fo ce fluids by mouth
Examine uri for suga and keto e bod es every 3-4 Hrs
R gular diet Aft 24-48 hours if pat t shows steady imp ovement p ace on r gula diabetic diet and beg n reg lat on as outlined on p 393

DIABETES ASSOCIATED WITH OTHER CONDITIO S

PREGNANCY

The m nagement of the p gnant diabeti is little different from that of a y oth diabetic

A During the rly period f p egnancy the e is ofte a lowering of th nal thre hold nd considerable lability of th blood uga l el

sodium chloride from the body may be as great as 30 Gm (50% of average total body sodium) in 24 48 hours In th mild case sod um chloride ne ds to be replaced and sodi um chloride sol tion with glucose is usually adequate fluid therapy

3 Replacement of bicarbonate buffer As the ketone bod es are excreted or oxidized CO_2 is formed which replaces the disappearing ketones and the CO_2 combining power ret rns to normal However in patients with severe uncomplicat d metabolic acidosis it may be advisable to administer more rapidly available HCO_3 and fixed base (i e Na^+) This may be given I V as sodium bicarbonate or M/6 sodium *lactate*

4 Potassium replacement As sodium is administered (as sodium chloride sodium bicarbonate or sod um lactate) and glucose is metabolized and stored the potassium which has entered the extracellular fluid migrat s rapidly intra cellularly or is washed out with the flu d through the kidneys Wh n this occurs there may be a temporary and da gerous xtracellular potassium d ficiency with w akness respir atory dist ess and at times cardiac arrest Sol t ons containing potassium must be given to correct this and generally when I V glucos becomes indicated p tassium may be added to the infusion mixture (see p 21) It must be used with extreme aution in the absence of adequate urin ry output Th level may o ghly be checked w th th Ecg (p 14)

Tr atment.

A Emergency M asures The following is an outline of the apy that may be mploy d in th average patient in diab ti coma however each case must be individ alized and therapy modified as neces ary accord ng to the needs of the patient

1 Hosp talize patient Keep pat e t warm avo d ex e iv warmth Avoid the u e of ba biturates and narcoti

2 If n *SHOCK* treat w th I V plasma and othe shock m as re especi lly vasopresso s (se p 27)

3 Blood chemistry Draw blood for CO_2 ombining powe and blood s gar also for sodi m potass m nd chloride if these tests can be performed

4 Give i sulin at onc

a *Through sam n edle s d fo d awing blood give 50 100 units of regular or crystalline insulin I V imme d ately* as well as a like mount s b utan o sly

b Repeat insulin giving 50 75 un ts ubc t every 1 2 hours until th re is rapid dimin ti in blood or urinary s ga

5 Catheteriz patient An indwelling thete m y b left i place allow this to dr in contin ously Examin spot (per odic) uri e sp imen very ho r for ketone bodies and s gar

6 Fluids electrolytes a d glucose

a Begin I V infusion of saline May also b gin lysis of a line M/6 sodium lactate o oth r i di ated solutions at sam time (see p 15) As oon as rin ry sugar has changed to [illegible] n red ti n hang I V fluids to 5% glucose in sali e to whi h 1/2 1 unit f

B F T um Although in reas d bohyd ate tolera de velop rap dly a a sult of t um th p inciple dange in a t t d d b ti who inj red s th possib lity of having a se e hypogly mi react on beca h f ils to eat Th e fo if th pat e t onsc ous give sw t ned ra ge ju or ca dy by mo th if s g ry is e ry giv 5% gl co e I V in wat o sali lowly One m y add 1 unit insulin per 2 3 Gm gl cos t th nf s o h w ve th need not so m h fo in lin as f gl co to avo d hypogly m a When s g ry h s b n compl t d t at acco ding to verity of dise s (e p 394)

Elect v S gery

A I t l H p t l M a

1 P t ent ho ld ent ho p t l s veral d ys befo e surg ry
2 D ti e p ot m n inc in ulin
3 Th d ab tes sho ld be br ght nd opt m m co t ol with gul r or c y tall n ins lin
4 There should be o keto i

B D ing nd Aft S g ry

1 N f od o in ulin sh uld be dm niat d on the m rning of gery
2 Ma gem nt during s gery
   If th p t ent diab t is mild nd has b en p operly o t ll d if h d es n t tend to de l p k tos s and if th rgery i ot t ext n ive h m y be op rated on w thout f od o i suli
   b If th p t t diab t s s mode at or ve o if e te s s rge y m t b p rf m d begin infu n of 5% gl os in lin o wat to whi h has be add d 1 unit gula r ry talline i sul pe 2 Gm gl o C n ti u inf s on th o gh t su gical p ocedu e Giv inf sion t abo t 60 70 d ops per mi t
3 Afte s gery patie t hould hav small freq t f dings (50 75 Gm a bohyd te) ve y 3 4 hou cov red w th 15 25 nit of ryst llin i ulin sub t u ly b fo e th m l Thes mall fe dings ont u d ntil mal nut ition a be stablish d
4 If ga t oint stinal s gery has b n p rf m d nd pat nt cannot take food by mo th n trit n can b t be m inta ed by pa nt l m th d giv 1000 c 5% gl co in 5% mino a d s l ti n I V slowly ov a per od f 4 ho r This h ld b ove d w th 15–40 un ts of rystallin in ulin bc t b fo beginning inf ion Th lite s per day s n r g q i m nt This the apy nay b ontin ed nt l r l utrition can be es med

HYPERINSULINISM
(Adenoma code No 871 8044A)
(Without Tumor code No 871 784)

Hype i ulnism a d by exc s v p odu t on of in ulin a d manif ted by att ks of w akn hunge ir it bility faint n a d t emo a d co v l ions all f whi h u ually occ o

B During the latter three mo ths there is often a marked decrease in glucose tolerance necessitating increased insulin dosage This is not universal however and many go through pregnancy without significant changes in tolerance

C *Before the onset of labor and delive y it is advisable to change* to short acting insulins to avoid poss ble reaction from lack of food

D In view of work suggesting sex hormonal imbalances in pregnant diabetics therapy with estrogens or progeste one or both has been advocated as being of val e in diminishing fetal mortality However carefully controlled studies using mod n diabetic treatment methods show as *good or better* results witho t resorting to this expensive and troublesome procedure

E Since many diabetic pregnancies go beyond expected t rm or *the infants are un s ally large it has been suggested by many* that pregnan y be terminated at about 36 weeks The preferred method appears to be esare n section

The Care of the Infant

Treat all infants of d abetic mothers as prem tures Keep infant in incubator nder oxygen for first seve al days Observe *the newly born infant caref lly fo the first 72 hours for hypo* glycemic reactio s that may occur supposedly as a result of islet cell hyperplasia This is more apt to occur in th n wborn of poorly cont olled diabetics

SURGERY

Surgery in the diabetic at prese t pres nts l ttl hazard over that of the surgical proced re pe How ve there a e rtain problems p culi r to the diabeti and thes probl ms naturally *vary with the severity of the dis a and the rge cy of s rg ry*

Eme gen y S gery

A F Non T aumati Conditio s Usually d abet cs requiring em rgency *surgery fo non t a matic d sorde s are in k tosis* with or without acidos a d requ re imm diate tre tme t of their diabetes Thes pat ents should b tre ted s patients with ac dosis o coma (the l tter if a g ral a esth sia to be used) The general p ogram *should be as follows*

1 Draw blood for CO_2 combining power and blood s gar lso for electrolyt pan l (sodium potas um chlo de) if poss ble

2 *Begin 5% glucose in saline infusion I V slowly (not over 70 drops per minute) and continue infu sion throughout surgt al procedure* One unit of nsu li p r 2 Gm gl cos m y b added to the infus on (25 units for e ch 1000 cc of 5% gl ose)

3 G ve 50 units short a ting i sulin I V if ketosis i present

4 After ret rning from urgery contin therapy as fo d a bet c coma (ee p 404) until o al f d ng can begin a d ketosis and hypergly mia are ontroll d

Chapter 16

HORMONES AND HORMONE LIKE AGENTS

PITUITARY AND PITUITARY LIKE HORMONES

The pituit y onsi ts of two p rts

A Po t ri po t o wh h p t of the C N S

B Ante ior porti n which is de oid of di ct n ral inne ation

Ce tain p tu t ry like ho mon s that infl e ce th gon ds a e lab t d by the pl ce ta d ing p egn n y

ANTERIOR PITUITARY HORMONES

All of the ante i r pitu tary h rmo s a protein ub t ce and mu t the fo b dminist red p rent rally t b ff ctiv if t ken by mouth th y a dig st d by the digestiv enzym s In ge l with th ex ption of the g owth d lactog nic h rmone wh s effect a e ot medi t d dire tly th o gh oth r gla d the nteri p t it ry hormo es ppe to hav a egulatory function r th oth r gland of int nal s r tion

In the la t f w y rs s e al of th se hormo s hav be n pr p ed in p fo m Th se th t ha been p ep ed in pu r lm t pu f m t dat re the growth adre o o ti ot opi (ACTH) lactog ni thyroid stimulating (TSH) f lli l stim l ting (FSH) and inte titi l ell stimul ting (lut ni ing) ho mone Th r may b oth f t rs in the ante p t itary but th y ha not yet be n f lly dentified Of the p e prepar t ons only ACTH and thyrot pin re at pre nt omme ially ailable

C t t opin (ACTH)

Corti ot opin h b en hown to h v remarkabl eff cts in rre ting m y di a e p oces s which a not sat f cto ily in fl en d by oth r the ape tic ag ts Its ff ct i enti ly m di ted by th stim lation of the ad al ort Co ti ot opin is a p otein f sm ll m lecul si and rtain peptid s d ved f om it ha b en f und to h similar and s ma ked phy iol gic l ffect s the h m it lf

A M t bol c Eff ct in H ma ACTH in d quat d s in nor mal human being p od e th foll w ng m taboli ffect

1 In as d e tion f nit og n potas i m and pho phoru
2 Rete tion of odium and e ond ry tention of wate
3 Ele tion of f ting blood ug and diabetic gl o e toler an c e
4 Inc eas d e tion of u ic a id

F

an empty stomach long after meals and are relieved promptly by the administration of glucose Hypoglycemia noted during episodes usually is below ~0 mg % A glucose toleran e curve d op to ex ceedingly low levels often only after 5 6 hours is cha acteristic Hypoglycemia of hepatic nervous or other endocrine gland origin must be considered in establishing the diagnosis

Tr atm nt

A Emergen y Tre tment As for hypoglycemic react on from insulin overdosage (see p 402)

B Ge eral Mea u es

1 Corticotr pin (ACTH) or the cortisones The admin strat on of these drugs (for their hyperglycem c effect) has been shown to be of co siderable benefit in the management of some children suff ring from this condition S me children without adenomata ha e b en successf lly maintained or treated intermittently with these drugs

2 Diet High protein high caloric high fat low c rbo hydrate

a The diet is low in carbohyd ates in order to void stimu lation of th pan r as to elaborate insulin Rapidly utili ed carbohydrates are repla ed by slow acting o es (e g 5 10% vegetables and f uits and bananas and pples) Protein i an mporta t s urc of slowly libe at d ca bohydrate which appa ently has less stimu lating ff ct on th pancreas a d is useful to supply added calo ies

b Small feedings The d et is best divided into six or m re meals day It may be neces a y to feed th patient at regular int rval througho t the entire 24 ho rs If the hypoglycemia s a s v e as this it is advi abl not t prolong med cal th rapy but to prepare the p t ent prop erly fo surgery

3 S dat on Phenoba bital phenoba bit n 15 30 mg (1/4 1/2 gr) q d may b valuable in reducing n rom scular rritability

4 Restri tion of physical ct vity Ex r is in reases tili tion of glucos th e eby xagg ating the effect of x ess insulin If exercise is unavoidabl su h a t vity should be pre eded by supplementary ca bohydrates

5 Identif ation a d Patient should ry a bracelet o card sim lar to that us d by a di betic (see p 402)

6 Em rg ncy CHO Pat ent hould be requir d to arry a small supply of rapidly available carbohyd at (andy lumps of s gar) t all tim s H s to av d t king thes exc pt wh n defin t ly ndic t d

C S rgery Complete e c s on of hyp rpla ti o adenom to s isl t t ssue when this is found to b th a se

Chapter 16

HORMONES AND HORMONE LIKE AGENTS

PITUITARY AND PITUITARY LIKE HORMONES

The p tuit y ons sts of tw parts

A Po t o po t n wh h ap t of the C N S

B Ant r r p rt on wh ch i d oid of di e t u al inn v t

Certain p tuita y l ke h mon that influ n e th go ds a e labo t d by the pl c nt d ri g pr gnancy

ANTERIOR PITUITARY HORMONES

All of th ant p t it y ho m n s a p ot in substa s and must ther f re b admini ter d par nte ally to b eff t v if tak n by m th th y e digested by th d g t v en ym s In gene al w th th exc ption of th g wth and la t gen c hormon wh eff t are not mediated d ectly thro gh oth gland the ant ri p tu tary ho mo s ppea to h v a egulatory fun tion o th the gl nds of int n l s ret on

In the la t f w ye v al of thes ho m ha be n pr pa d in pu fo m Th e th t h ve b n pr par d in pur or lm t p e f rm t d t a th growth ad o rt otrop c (ACTH) l tog n thyroid stim lating (TSH) f ll cle stimulating (FSH) and int st ti l ell-st mul t g (l te n zing) hormon s The may be oth f tor n th ant i p tu t y but th y h ot y t b n f lly d t f d Of the p e p ep rat ons o ly ACTH and thyrot opin a e t pr nt comm ially av labl

Co t ot p (ACTH)

Co t cot opin has b en shown to hav rem rk ble ff cts in r e ting m y d ea p es e wh h r not at f cto ily in fl e d by oth th apeutic gent It eff t is ntir ly m d t d by th tim l t n of th ad al o t x Co ticot opin a p ot in of m ll m lecular i e a d e tai p pt d d ived f om it h v be f und t h e im l and a ma k d phy iol gi l ffects as th h mo it elf

A M t b li Eff t in H m s ACTH in ad qu te do s in n r m l human being p d s th f llowing m taboli ff cts

1 In e d c tion of t og n potassi m and ph sphoru

2 R t nt n f odium and se ondary r t nt on of wate

3 Ele tion f f ting blood ug and di beti glu o e t le anc urve

4 In as d x r ti n of u ic id

5 Increased urinary 17 ketosteroids and corti osteroids
6 Fall in circulati g eosinophils and lymphocytes and le a tion of polymorphonu lears

B For clinical eff cts uses and dosages see page 423

Pituitary Growtl Hormon (PGH)

' Pur '' PGH has be n employ d in normal humans pituitary dwarfs and panhypopituitary ind viduals *In no case has there been any evidence of growth as measured either by meta bolic effect or actual physical growth* Th older crude growth hormo e preparation have likewise b en of no b n fit under controlled expe imental condit ons

Lactog nic Hormon

Has not been employed in human r s arch Its pre ence i necessary for the initi tion and appare tly fo th continuation of lactat on in breasts which have b en prep r d for lactation by estrog ns and progest ron s during pr gnancy

Folli l Stimulating Hormo e (FSH)

FSH has d ffe ent act ons in *male and female* In th female FSH stimulates the development of ovarian foll cles In the male t stimul tes th germinal epitl elium of the test s to produce spe ma to oa It appar ntly l as o eff ct on the Leyd g cells hence does not influence te tosteron se r tion Pure FSH has ot been used clinically but in cas s of hypogonadot opic eu uchoidism a pur fied preparation has been employed aft r init al stimulation of Leydig cells with chorioni gonadotropin to initiate spermato genesis (e page 386) At p esent no good FSH pr parat on is commercially available

Int rstit al C ll-Stimulating Hormon (ICSH) (Lut n zing H rmon)

A In the f mal ICSH appa ently ha a dual act on
1 St mulates growth of theca c lls
2 Transforms the m ture follicles into orp ra l tea

B In the m le it stimulates the Leyd g lls of the test s w th re s ltant t stoste one se retion

Ther is no good omme cial pituitary ICSH *Clinically ICSH* i substitut d for by use of cho ioni gon dot opins which have a similar action (see page 413)

Thyr id Stim lating Ho mo (*TSH*)

TSH s exc edingly ff c ent in st m lati g the thyro d gland It has limited clinical usefulne s at p s t its p incipal uses are to differentiate pituitary hypothy o di m from primary hypothyroid sm It has also be n u ed in an attempt to stimulat metastatic thyroid cancer to take up adi iodin for th r peuti purpos s

Recently it has been advo ated fo t e tment of thyroidit s but its place in the management of th s d s se is still open to questio

Dos ges 5 10 U S P units I M ery 12 o 24 h s for 2 days Repeat I[131] uptake or p otein bound odi e If uptake or PBI s increased p imary hypothyroidism is not pr s nt

Oth r Hormon s

The pituitary prob *bly e abo at s oth r hormones (g luteo* t opin) but their exact physiologi al roles wn t pr

POSTERIOR PITUITARY HORMONES

The p ste r p tuitary hormones e polypeptides compo ed of 8 amino acids Th i exact ch mical str t es hav been dete mined and th y h v r ntly b en synth sized Lik th anterior p t tary hormo s th y ar eff ctive only when adminis t d pa enter lly (gi e I M) Th y e ert thr act on

1 They r e blood p ssur (pre sor ction) (an sthetized anim ls)
2 Cause fluid ret ntion w thout o motically equ alent od um r tentio (antidiur tic a tion)
3 C se ut rin ont a tions (oxytocic a tion)

To dat ther has ot be n a s p ation of the a tidiu etic f om th p es r principl Th y may be denti al The o ytocic fa tor may l kewi have som pr sor ffect

Cl f l Us

A A t di r ti P ess principl a us d primar ly for the t eatme t of d abetes ins p d s also to pr vent and nt ol abdomin l distent (F D bet Insipidu pag 366)
B Oxytoc is mpl y d l bst t ics when ind c tions for the in d t n of ut r ne contraction ist

Pr paratio s Available

Nam	A tion	H w S ppl d	Av ag Dos
Vasop in T nnate N N D (Pit es in T nn t ®)	Ant d u ti pr sso	O ly s l t on 5 units/ c	0 3 1 I M (5 16 ♏) q 1 72 hr
Va p in Inj tion U S P		Aq o olution 20 u its/	0 25 0 5 c (4 8 ♏) q 3 4 h s, I M.
Oxyto in I j ct n U S P (P t in®)	Oxyto i	S lut on 10 units/ c	0 3 1 cc I M (5 16 ♏) as i d ted

PITUITARY LIKE HORMONES ELABORATED BY PLACENTA

Th mo t impo tant of th pituitary lik ho mon s is that lab o at d by the plac nta d ring p egnancy The h mo e is efe ed to ho i n go adot opin Its physi log al act on is almost ide tic l w th that of ICSH bo It ha e ntly be hown th t thi ho m n app ently functions nly if an int ct anteri pituitary gla d is p nt It is of no valu i indu ing spermatog n is or ovulation or m int ining corp s lut um by its lf Many of its al leged eff ct have b n d e t the p es n e of FSH whos acti n the p e of ch i ni gonadot opin may pot ntiat

Cli i l I d tions

A In th M I

1 C ypto hidism In a f w s le t ases cho ionic gonado tropin m y ind e des nt of t ti l s
2 Hypogon di m Cho i ni gon dotropi i u eful in s m

types of hypogonadism although testost rone medication s generally preferred

B In the Female Chorionic gonadotropin may aid in inducing ovulation and maintaining corpus luteum in a few selected cases of sterility if adequate FSH is present

Preparations Available

A *Chorionic Gonad tropin N N D* derived from the urine of pregnant wom n is available commercially under a wide ar ety of trade *names It is marketed in ampules of 100 500 1000* and 5000 I U per cc

B Equine gonadotropins derived from the serum of pregnant mares is also available commercially This is a mixture of FSH and ICSH It is not g nerally recommended because of its marked sensitizing effect and p oduction of ant hor mones by protracted se Only sho t co rses should be employ d

Av rage Dos s

Usual do s range from 200 1000 units every day or every other day

THYROID HORMONE

The a ti e prin iple of the thyroid gla d appea s to be th iodin o tain ng am no acid thyr xin Thyro in probably ne e occurs in the free t te in the organism but is contained in a prot in molecule thyroglobulin Another odine containing amin acid diiodotyr s n with weak r physiol gical effe ts s als fou d i th gland Tri dothy o ne (od m liothy n ne Cyt m l®) h s bee isolated from the thyroid It a abo t 4 t mes as p te t s thyroxin and a ts mo ap dly Its exact physiol g c l rol is unknown The action of the thyroid ho mone is th t of a g neral ell l metabol stimulant with res lt nt i as d oxyg n consumption (e in c e ed metabolic ate) It x t mode of a tion is nkn wn

M thod of Administ tio

Thyroid hormon either in th form of thyrogl b li (desi ca ted thyroid) thyroxin or t iiodothy oni e is effe tive when tak n *orally* Th re is a marked diffe e in t s of metaboli respon ses between triiodothyronin and thyro d o thyroxin In the cas of thyroxin littl effect is noted after a si gl dose for ab ut 24 ho s and the maximal eff ct i not each d f r 8 10 days Aft r the medi ation is stopped there s a slow los of th ffect d pend ng on the initial B M R and the level ea hed during thy oid m dica tion In g n al it may be tated th t at l ast 4 6 w eks must elapse after thyroid *medi at on has been di ontinu d befor o e* can be reason ble c rtain that the eff ct ha e been dissip ted In the c se of *triiodothyroini e the p ak ffe t is eached in 12 24* hou s and th ffe t s over in about 9 14 days

Cl al U es

Thyroid hormon is indicat d only in thyroid d fi i ncy at t Its use as a general m t bolic stimulant is not indicated and i worth *less It has been sh wn that patient* with thyroid d ficien ies ra ly

requi ver 0 13 Gm (2 gr) of Thyro d U S P daily Pati t w th ut d f ien y states ca eas ly toler te 0 3 to 0 5 Gm (5 to 7½ gr) mo d ily without a y eff t on B M R alth gh th I131 uptak s upp e ed A good g n al rul is that *if a pati nt requires over 3 gr of Thyroid U S P daily his need for thyroid medication should be questioned*

P epar t ns Availabl

A Thyro d U S P B P (de ic t d thyro d) This is th pr p ar t on of h c The s n vide that any of th omm ial p parat o th ma ket ont i ing m o less odin than th offi l o s a e any less toxic To a d co f sion in do g s lways e th offic al thyro d
Dosage 0 065 to 0 2 Gm (1 2 gr) daily

B Thyr Thy S d m Th e is no ad a t g f the rys t ll e thy o o d s c ted thy o d It i app im t ly 300 t m s p te t a thyro d and o small cha ges dos may le d t to l l

C S d m L thy N N D (T i od thyr e Cytom l®) M e r p d t a d d sappe ra e of ffe t th thy d o thy x 3 4 t m s lor g ic a thyr id Exe t meta b li ffect w tho t levat ng pr t i b d od n hyp thy r d sm A ge m nt c do g 0 05 0 15 mg da ly

PARATHYROID HORMONE

P athy d hormon a prot n sub tanc d ived f om p a thy id gland It an ot be mploy d lin lly f mo th n a f w d y w ek fo t p dly b om in ff ct v (p bably th ough p odu t of ant h m n ant gens)

Pa athyroid h rmon has maj ff t n c l ium d ph s ph s and h n bon met b lism It ff t is t c use a in d r al x et on of ph sphoru l dng to m bil ti n f c l m and pho phoru f om bo and p ob bly t a di ect de l f t of bon th gh stimulat of the ost ocl ts

B a s f th a t ho mon eff t that dev lops t pa athy o d h rm e two oth pr pa at on a mploy d in ts pl c Th y a e dihyd ot chy ter l (A T 10) and vit min D Both of th se ar t ls and are ffe t e by mouth Although t fir t A T 10 w s th p par t on f h ic t n w ppe r th t vit m D is lm st eq lly ff tiv

Cl al I d t o

P athyro d h mon is i d ted only in a t p st g l hyp p athyr d t t y (ft a id ntal moval of par thyr d gland)

P p t s A ilabl

A P athyro d Inj t o U S P Aq s ol t conta s t l s than 100 un ts p cc
A er g d s 50 100 u ts (0 5 1 0) 3 t 5 t m d ily

I M as I dicated

B D hyd otachyst rol N N D (Hytakerol®) Each cc c nta ns 1 25 mg of dihydrotachyst ol n oily sol tion
Dosag See p ge 378 See p ge 378

C Calciferol U S P B P (Vit min D_2) 1 5 mg (^{1}60 ^{1}/12 gr) da ly (has a poten y of 40 000 units pe mg) (see p ge 378)

THE ADRENAL HORMONES

ADRENAL CORTEX

The hormones of the adrenal cortex ar all steroidal s bstances To date ov r 30 d ffe ent steroids ha been is lated and id ntif ed from an m l adrenal glands or adrenal venous blood The vast ma jority of thes ste oids have no demonstrable metabolic eff ct

Questions have b n raised as to wheth r or not all the teroids isolat d f m the adren l cortex are truly natu ally occurr g or whether they are art fa ts p oduc d in the h mic l labo tory Recent olation of hormo e from blood obta d by catheter z tion of renal veins show that most of the ho mone (bout 90%) is 11 hydroxycorti osterone (Compound F) and abo t 10% corticoster ne (Compou d B) In general it may be stated that the best dem nstra tion of the effects of adr nal cort cal hormone r ho mon s s that seen following o t: otropin (ACTH) admini t t on (see page 423) Recently aldoste e has been isolated from ad nals Thi h r mone appe to ha e only sodi m a d water ret ini g and potas sium losing ffe t It is about 20 t m s as pote t as deso y o ti coste o (D O C A) Hormones w th estr g ni and andr g nic effects h ve lso bee ı olated

Clinical P ep t

Of the d en l teroids isolated th ee h v had signifi ant clinical u nd trial In addition t th se two important chemical de i ative ha e been p p ed

A Des xy orticosterone A tat U S P Deoxy ortone A tat B P (D O C A) It o ly s gn f cant met bol effect sod um a d wate r tention nd e s d urinary potassi m x cretio In this sp t it is approximately twe ty tim s pot nt a cortison It has no effect on c bohydrate r pr t in metabol sm

B Co t A t te, U S P , B P

1 The p ipal m tab l c effe t of t so e
   a Ret tion of some sodi m a d water
   b I cr ased e retion of it ogen pota sium d phos phorus
   c Increased blood s g nd b lity to maint in blood g r l vels d ring f st g in Add onian patie t
   d R turn of EEG p tt n to no m l in Addisonian p ti nts
   e One of the mo t mp rtant eff cts is the adr nal corti al atrophy which results with p ol nged e thi is prob bly du to e doge ous ACTH inhibition d m y esult i th abse ce of th normal respon e f th pituit ry dr l axis to str s

2 For clinical effect a d us se

C Hyd o o tiso U S P This compound ha rec tly b me a labl fo ral I V a d local (g int artic l) use It ctio s a e s mila to th s of cortio e It i pr b bly ab t 1½ t m as p t t as c tisone o w ght b al Th m tab lic ff ts of hyd ocort o e app a to b ident cal with those f ort

D H log at d D r t es of Co tisone and Hyd ocortl o V o h l g t d de t e h v bee p p r d Th m st import nt f thes s the 9 alph fl or der v ti e of hydr o t Fl d ocort e A tate N N D Thi drug i 15 20 tim s pot t s hyd ocortis e It chief d dva tage is th t it ha p ofound eff t on salt a d w te ret tion abo t 5 t mes a g e t as th t of D O C A and is f lim t d useful s x pt poss bly Addison disea or t pically f r t nt fl mm t ry ff t

E P d o N N D P dni olo N N D a d M thyl p dn l (M d l") P d so e and p dn olo e a the d hyd o l 2 d r t of co t o a d hydro ort e pe t ly Ther appe r to b l ttle if any q t tat e d ff n e b twe them Th y differ f om th i pa t compo nd th t th y (1) se l ttle if a y s di m r te t on (2) p ss bly us less p t s i m l and (3) a about 3 5 t mes po t t in ther m t b h nd ther p tic a tio Fo thes a s th y r g n lly r pl ci g their p t ompo ds wher thes ho mo es a us d fo oth tha pla me t th apy (e g d en l ins ff c e cy) M thylp ednisol is b t 1½ t mes pot t s the predniso e and p ed isolo e It pp to h o th ad t g

F Whol Co t l F t t A w t ol bl e t t of th adr l gland Altho gh it ter id co t nt (f any) and mode of tion p ly nd st od this g nt pp a to b of l in th m rg n y man g m t of d n l cr sis R cently an attempt h b n mad to on e t te d e l o t cal xt a t in an oily l ti Th s ltant p od t lip c t l xt t i also eful but d t th l w r bso pt on (f om I M t) and d t th fa t that t may ot onta n me of th s ti l dr n l co t cal ubstan es t ho ld not pla q ou t l ext t L po rti al ext t h b en howt t tain m ly mpound F (b t 2 mg /c) w th les ompound E

P p ti Av l bl

A D y t t e A et t U S P D ycortone A t t B P (D O C A) or De y t ost ro T m thyl t t U d o ly for ppl m tary m t an of Add s di s

1 B l t blets 2 mg t blets f r ab rpt n f om mu us memb e D O C A i i ffe tive wh n sw llowed
   D s g ½ 2 tabl ts daily di ol d in th b al gutt r It im t q lly ff ti e in a giv d as wh n inj cted
2 Sol ti n in s m il 5 mg (1/12 gr) p
   D s ge 1 3 mg (1/60 1/20 gr) I M d ily f maint nan e
3 P ll ts U S P 75 mg (1¼ gr) o 125 mg (gr) ach for ubc t mplantat
   Do g O 75 mg pell t f each mg of D O C A e qu d by inj tio p to 3 mg (1/20 gr) p d y If e

I M as I dic ted

B D h drotach stero N N D (H t kerol®) Each cc conta.s 1 25 mg of d hydrota ryste ol in o iy so tion
Dosage See page 378

C Cal iferol L S P B P (Vitamin D2) 1 5 mg (1 63 1 12 gr) daily (ha a pot cy of 4J 0 u un t pe mg) (see pag 3 8)

THE ADRENAL HORMONES

ADRENAL CORTEX

The ho m on s of the adrenal cortex are all steroidal substances To date ov r 30 d fferent steroids ha e been isolated and id ntified from animal adr nal glands or adr nal venous blood The vast majority of these steroids ha e no demonstrable metabolic eff ct

Quest ons have be n ra sed as to whether r not all the steroids isol ted from the adrenal cortex are truly natu ally occurring or whethe they a e artefacts produ ed in the chemical laboratory Re ent solation of hormones from blood obtain d by cath teriz tion of renal veins shows th t mo t of the hormone (about 90%) is 11 hydroxycorti o te one (Compound F) and about 10% o ti ost ron (Compound B) In ge e al it may be stat d that the best demonstra tion of the eff cts of adrenal ort cal hormone r hormones I that se f llowing ort cotropin (ACTH) administr tion (e pag 423) Recently aldost ro e has been sol ted f om adrenals This hormone appear to b e only sodium and water retaining and potas sium losing eff ct It is about 20 time as potent s des xycorti ost o e (D O C A) Ho mon s with estrog nic and androgenic ffe t h e also been isolat d

Clinical Pr pa at ons

Of th d enal teroids solated thr e ha e had significant lini al us and t i l In addition to these two important chemical derivatives ha e been p ep d

A De oxy orticost ron A etate L S P Deoxycort ne A etate B P (D O C A) Its onl gnif cant metabol ffect ar sodium and w t r tention and incre sed u inary potassium ex retio In th s espe t it approxim t ly twenty time as pot nt as ort son It has no eff ct on a bohydrate o protein metabolism

B Co t s Ac t t U S P B P

1 The p pal m taboli effe t of ort sone ar
   a R t ntio of som sodium and water
   b Increa ed e retion of itr g n potas um and phos phorus
   In re sed blood sugar and ab lity t maintain blood sugar l v l du ing fa ting in Add sonian pati nts
   d R turn of EEG p tt n to no m l in Addisonian p tient
   e On of the mo t important eff cts is the adr nal corti al atrophy which results w th pr long d us thi is probably due to ndoge us ACTH inhibit and m y sult in the absenc of the norm l pons of the pituita y d nal axis to str

2 F r clin c l effect and use

4 Rare uses in ca d ology e g Stokes Ad ms syndrome and c diac a rest
5 D agno tic test of hepatic gly ogen storage

B P ep ti s A ailabl
1 Epinephrin Inje t on U S P Adr naline B P 1 mg / c (1 1000) Administe ed gen ally subcut may b given I M and even I V if diluted in 1 liter of soluti n Do age 0 2 1 cc (3 16 m) as indi ated
2 Epinephrine Inh lation U S P 10 mg /cc (1 100) For inh lati n only
3 Epinephrine in Oil Inje tion U S P 2 mg /cc (1 500) Administe ed only I M Usual dos 0 2 1 cc (3 16 m)

Arte e ol (Norepin ph ne)
A Cl n l Us A t n l s used almost ex lusively for its vasop es o ffect U d in a ute hypotensive states (surgi al and non surgic l shock c nt al vasomotor d p ssion and hem rrh ge)(se p 27)
B P p at n A ilabl Levart re l Bitartrate U S P (Levoph d®) 0 2% olut n ontaining 1 mg fr e base per cc (1 1000) in amp ls ontaining 4 c
C Mod f Adm iat t Add 4 16 c or o cas nally mo e L vophed® to 1000 c of ny a l t on fo I V u th ough M rphy drip bulb Det m ne resp nse to initial d se of 0 25 0 5 c of d luted s lut n p r 10 Kg body weight and then maintain flow at rat to maintain blood pre sure (usual te 0 5 1 (min) *Arteren l t a very potent agent and great care must be employed in its use Do n t allow solution to infiltrate or slough may result*

MALE SEX HORMONE

A number of t r idal hormone ha been i olat d f m th t sti and f the e th m st p tent ndr gen has be n testost rone It is b l d the ef re that t sto t on is th male sex ho mon Testo t rone is r sponsible f r th devel pm nt of sec d ry sex ha cter st s in th m l (i f cial hair d ep vo d el pm nt of pen s prostat nd seminal si les) Adm nis t ation of t st ste n to th f male ause dev lopm nt of male se nda y ex haract sti s In th f m le th ad ra andro g ni eff ts can b p rtially o e ome by the imultane us dminist ti n f t g ns

Of gr t gr ater imp rtance tha its and og nic ffe t is is p otein anab l (tis ue b lding) ffe t T t st on lso has m ld od m hi d and wate ret ing eff t

T at t
F e t st ste n nd t st t on propionat ar not eff cti when swallowed At pr ent the only way to administe the ag nt ff tively is to pla e th m under th skin by inje tion or a pellets A te t st on pr pa ation which doe not o cur naturally m thyl te t t r (MT) i ff cti e when swallow d M thylt sto t on n human ind e a marked atin ria and ha app ntly produ ed jaundic afte p l ng d admin tration oth w s h w r it m tabolic and and og nic ff ts simila to tho e of t sto te on

quirements by injection exceed 3 mg (1/20 gr) one additional pellet should be implanted [e g for a requirem nt of 5 mg (1/12 gr) per day by injection implant 6 pellets] Duration of action 6 8 months

4 Desoxycorticosterone trimethylacetate 25 75 mg I M o ce a month

B Adr al Co t F t act, N N D May be adm nistered I M subcut or I V Used in treatme t of Addi onian cris s
Dosag 20 100 c (5 20 dr) or more daily as indicated

C L po Adre al Cortex Steril Solution (C A) Administered I M only
Dosage 5 cc (1¼ dr) I M daily during crisis in add tion to aq eou adrenal cortical extract 1 2 cc (16 m ½ dr) d i y for maintenance

D Co tisone (Compound E) See page 424

E H d o ortisone (Compound F) See page 424

F Fl dro o ti one See pag 425

G Pr dni o a d Pred solone See page 425

ADRENAL MEDULLA

U til recently it has been thought that the adren l medulla se cretes a single hormo e epi ephr ne However it has be n shown that e tracts of ad enal medulla of cattle (*U S P Refere ce Standard*) ontain two clo ely r lated hormon s i e epinephrine (about 80%) and nor epinephrin (about 20%) The two ha e differe t actions as o tlined below

Substa ce	Blood V sels	Cardi Output	Blood Pres ure	Blood Sugar (Gly ogenolysis)
l Epinepl rine	V sod l tion (over ll) g ally	I cr as d	El v t d ?	El vated
l No epineph rine (levar t r nol)	Vasocon strict on (ov rall)	No ff ct	Elevated	El ated 1/8 that of epinephrine

Vasodilator of c r nary art r e

Sin e epinephrin may b ynth t c or der ved f om nat ral sources (usually the l tter) and hence ontam nat d with nor epin phrin th e son for som of the appar t paradox cal physiological effects of the p e e t pr p rati n be omes lea er

In addition to the above pinephrin auses n immedi t el vation of bl od sugar by indu ing glyc g n lysi in li e and muscle

Epinephrin

A Clin cal Us Epinephrin is us d in a gr at many linical cond ti ns in lud ng the follow g

1 *Allerg c conditions* Bro chi l thma urt caria ang o neurotic ed ma and oth s

Co t ol of superfic al ble ding sp ially f om mu o a membranes

3 Used with lo al a esthetics to slow d wn ab orption

C Ch i f P p rati In view of th g eat n mbe of p ep- r t on va l bl it m y be diff ult to decide whi h to e Th phy i hould hoos thos prep atio s wh h are mo t co mical to the patie t a d still e ffecti e The us of te t tero e by repeat d inj tion sho ld be reser ed only fo thos very f w co dit wh e m thylt stoste on hould not b sed wh e the p t nt m t be der very lose obs vation (pr ferably in a hospit l) wh e the do m t b very exact (i res rch) E n in the ca es in wh h m thylt tost o e sm t b sed pell t of f e f tost o e may be g ven to th patie t o r l ti may be in tr ted in th admin st tion of I M med ti Th ref e th tr tme te of choice become methyltesto tero e or lly implant tion f test ter ne pell ts or one of th long r cting t stoste o pr p ration

FEMALE SEX HORMONES

The f mal v y s et two ster ids with m ked phys o l gical ff ct n mely est og n (α- st ad l) and p g st one

E t g ns

A Effect f E t og s in the Human The p im ry ctions of est og n ar

1 P life ation f dom tr um
2 Changes in v gin l ell (co nifi ation and low ring of v gi n l pH below 4 0)
3 D ct l prolife ation f b east
4 Stimulation of osteobl ti activity
5 Slight p ot in anaboli ffect
6 Mod ate od um and wate ret ining effe t

B Cl ni al U e E t ogen s us f l in both for their ff ct on st blast n th tr tm t of osteoporo is

1 Fem le E trog n is us d s repla m nt the py in c ses of ian fail e (g m opaus)
2 M le U d adjun t in th apy of ar ir oma of p ostate

C P ep rat ns Availabl The e a e many substan es that hav est ogenic act ty in l ding n ter d substan s (g d thylst lbest ol di nest ol he est ol) H w v r of all th te d only rt in of them are set l clinically Th s no evid n th t any f the est og ns ar l s t xic than any th Toxicity (i u a and vom ting) i us ally d to ov rd ag Most of th e trogen ar x edingly pow ful dr gs havir g p f und phys ological eff ts in v y mall dos and al o having th p uti and to i l vels that ar qu t im la Th physi ian should lect l o 2 g d p eparat n and l rn th ir cha ct istic rather than hange to n w on s The is little o n ed at p es t t admin te th e tro ge s by any b t the o al ont ab orption ms to be v ry ompl t and the e is no evid n e that n a o v miting an be d cr as d by p nte al dmini t ation Th e is l k wi no vid c th t th natu ally oc ur ing strogen s e any mo ffic iou than the synthet on s Although st g n pp ntly pl y s ol in mammary tum s of anim l th is n vid n that th y ar ar in g nic in h m ans

and testosterone propionate Testosterone and testosterone p o- pionat wh n injected (or swallowed) are partially (about 30 50%) excreted as 17 k tosteroids in the urine M thyltestosterone is not excreted as 17 k tost roid In fact its administration will result in d minish d urinary 17 ketosteroids du to diminish d endoge ous testo terone p oduction

A Clin l Us s In eith r sex testosterone may be indi at d in any d bilit ting disease for its protein anabol c function In addition there are certain us s specif c to the diff r t s xes

1 M le As pl cement th r py in failure of endoge ous tes tost rone s cretion (e g e h d am male llm cteric) Its u in impoten e angina pectori bom se ual ty and benign prost tic hypertrophy is without be efit

2 Fem le

a Gynecologi conditio s Function l uteri e ble ding e dometriosis dysm norrhea and p me str al tension

b Disease of the breast Advanc d c rci oma ch ont cystic m stiti supp essio of lactation

B Preparat o s A labl

1 Te t t o e U S P (Fre)

a P llet U S P 75 mg implanted subcut Dosage 4 8 pell ts ev ry 3 4 months

b Mi ro s pension in aq o s sol tion for I M use The dos g s ha e ot yet be n det rmin d but app r simil to t stosterone p opio ate in oil

Oi tm nt 5 mg /Gm for lo al testo terone ffect Aver ag d 0 5 1 Gm locally rubbed in o r 5 min b i d

2 Testoste o e Prop onat U S P B P I oil for I M in j ction 5 10 25 a d 50 mg / Dose v ries from 10 100 mg daily dep nd g o diti b ing treat d

3 Test st ro e Cy lop tylpropio ate N N D (Depo t stoster one®) i oil for I M nje tion 50 and 100 mg /cc This prep ation ha a du at o f a t o 2 to 5 t mes or more th t of t stosterone prop o te Do g 100 200 mg w kly to 500 mg mo th ly n a si gle do

4 T stoste one Ena th t N N D (Del te t yl®) in o l 00 mg / c Th d tio of ct on of this p ep ati is c m pa abl t th t of Depo t st st o ® Th v r ge dose is 200 400 mg every 3 4 w ek

5 Methylte to t ron U S P B P *Do not use methyl testosterone in treatment of thyrotox cosis acro megaly and yig ntism or liver diseq e*

Dosag 5 20 mg d ly

a Tabl ts 5 10 25 mg for oral

b Tabl t 5 10 mg fo s bl g al o bu al administra ti n Th is no advantage of bu cal ov o l u e

O ntm t 5 mg /Gm

6 Fl o vm ste o e N N D (Hal te ti ®) Thi d g a fl o o d iv ti of m thylt t t o e It s bo t 2½ times as potent a the p re t d g Its to ty el t e to that of methyltest ste o e is not y t know It i pplied in 2 and 5 mg t bl t Dosag i 2 10 mg daily o ally

7 No etha d olo e (Nile a ®) i a a abol ho mone w th alleg dly le s corresponding nd oge ic ff t than oth testo t rone preparat o It is s ppli d in 10 mg t bl ts A e g do ge i 30 50 mg daily o lly

C P ep t s A ilable See t ble below

P epa at	Method of Admi t t	D g
P og t ron U S P B P	I M	5 10 mg d ly
I je t f P g t o U S P B P	Pell t fo m pl nt t on O l tabl ts*	100 200 mg (f r h bitu l o thr at ed ab t o)
Hyd yp og te o C pro t N N D (D l l ti ®)	I M 125 mg /c	125 150 mg e ry 2 weeks
Eth t U S P B P	O l t bl t	60 100 mg da ly
No th t (No l ti ®)	O lly 5 mg t blet	20 50 mg d ily (tw to fo time s po te t ethist o e)

The is l ttl f y d ffe c ffecti n s f w ll w d p ogeste o e or eth stero

CLINICAL USE OF CORTICOTROPIN (ACTH) AND THE CORTISONES

In th p st few year both pituita y adre co ti otropin (ACTH) a ting by ad enal timulat on and the C 11 o yg nat d adre al st ida (o tiso s) h v be n shown to have p ofound m difying ffects on many d ea e p ce es Thes ffe ts an t be plai ed at p ese t on the b sis of th kn wn metab l and immunolog al a t v it s of th se ompou ds (see pag 411) *These agents do not app ar to cure* Their ct n appea s to be modific tion of c llul tivity p rm abil ty so that toxins o longer can af f ct th ell When th drug is dis tin ed th dis s may rapid ly No othe hormones or omb t ons of agent th t a e v labl c mm c lly t d y have th effect of thes sub tances The dise es in which ACTH and th o tis nes have been tr d in uffici nt in tan es to w rant th val tio ar outl d o p g 428 In gen ral t can b aid that th se agent ar int hange able b t a ion lly a pat nt found t b esp ns ve t o of thes h m es and not t th oth r

Do ag

Dos ge v y s der bly in e h individ al In gene al it is dv able to employ th lowest d e th t gives th desired eff t It g erally advis bl t b gin with la g r doses and th d re se as r pidly as po sible

A Co t t opi U S P (ACTH) Ma y pr pa tions l bl (s e p g s 424 and 425)

B C ti one A t te U S P A ailabl und o s t ad m (e pages 424 a d 425)

C Hydro rti U S P N w av il ble omme ially Hyd o t so p b bly *the principal* t oid elabo *ted by the* d l o tex It i ab ut n and o half tim s pot nt as ortison (s e p g 424 and 425)

D P d i n , N N D d P d i lo , N N D Th s A d ri ti es f o ti d hyd o t n e p t ly h r c ntly b e int od c d Fo ge al l i l s th y pp to b peri r to th i p t c mp und b s th y xh bit

A list of a few estrogens with the most useful dosage in terms of approximately equal physiologic l effects is given in the following table

Drug	Dosage a d Admini t ation	Comment
Diethylst lbe trol U S P Stilboestrol B P Tablets 0 1 0 5 1 0 mg (1/500 1/120 1/60 gr)	0 1 0 5 mg daily by mouth	Synthetic n ste o d strogen Cheape t E cellent preparation
Hexestrol N F Dienestrol U S P B st ol N N D	0 2 0 5 mg daily by mo th	No d antage o e di ethylstilbestrol Gener ally more expe s e
Ethi yl Estradiol U S P Tabl ts 0 02 0 05 mg	0 0 0 05 mg daily by mouth	Synthetic estr g n Exc llent prepar t on
Estrone U S P (Theelin)	1 mg 2 3 tim weekly o 1000 I U /daily I M	L'ttl d at p t prefer conjugated estradiols below
Estrad ol Valerate N N D (Delestrogen®) (in sesame oil)	10 20 mg I M every 2 3 weeks	Lo g act ng estr g
Estradiol Be oate Inje tion U S P B P sol tions in oil)	0 5 1 mg every oth r d y I M	Estrogens for inje tion a e rarely n eded
Estradiol Dip opionate U S P	2 5 mg 1 2 tim s weekly	Slightly longer effect than strad l be oat
E t ogen Substances Conj g t d N N D (Amnest gen® Prema in® Co est on®)	1 25 2 5 mg daily I M or by mo th	N t ral estrogen Rar ly indicated

Progest ones

Th p og sterones a e of rather limited u e n medicin

A Effect

1 Le d to the se retory phas of endom tr um Progest rone in th abse of st ogens does not have any significant ef f t on the ut i e the uter s m st b stimulated (prolife at d) by estrogen b fo proge t ro can a t

2 Acin prolife t n of brea ts

B Cli i l Use The p ogeste on r of rath limited v l e in clin cal m dicine Th ir main uses a e

1 P odu tion of a normal m n t u tion P ogest ron may b u d with estrog s to maintain mo normal cycli al m n t al f nct in women who otherwi e a witho t m nst uation

2 M di al D and C Another f p og stero e s to prod c th so called m d al dilatation and urett ge It i a tually t t of adequa y of endogeno e t ogen pro d ct o It is performed a follows Gi e 10 mg prog s t r ne I M da ly fo 5 days o 125 mg Hyd o ypr g st ro e Cap o te N N D (D lal ti ®) I M on If m nstrual bleeding occ rs w thin 10 14 d y of the fi t do e it indi cates that ad quat amounts of e d g nous est ogens a being p oduc d

3 In some cases of h bit al o

C P epa tions A a l ble Se t bl below

Pr p ration	M thod of Adm istration	Dosage
P ogest o e U S P B P	I M	5 10 mg daily
I ſ t of Prog t r e U S P B P	*P llet I r m* plant t on O al t bl t *	*100 200 mg (for* h bit al or thr atened ab t)
Hyd yprog st ro C p oat N N D (Delal t ®)	I M 125 mg /c	125 150 mg ve y 2 weeks
Eth t n U S P B P	O l t bl t	60 100 mg da ly
N eth te o (N l tin®)	O ally 5 mg t bl t	20 50 mg daily (two to fo times as po t nt s ethist on)

Th e l til f a y d ff en eff t n s f sw llow d p oge t e o ethi t ro e

CLINICAL USE OF CORTICOTROPIN (ACTH) AND THE CORTISONES

In the p st few yea s both pituita y adre oc rti ot opin (ACTH) a t g by ad enal st mulation and the C 11 o yg nated adrenal st o d (c rtisones) have b en shown to h ve p ofound modifyi g ffect on many d ea e p oc ss Th e effe ts an not b expla ed at p e nt n the b sis of th kn wn metabol c and immun l g al activ tie f these compou ds (see pag 411) *These agents do not appear to cure* Their a t on app s to be a modif cation of ellula ctivity perme bil ty s that to ms n lo ge can af f t th ell Wh n the dr g is dis ontinu d th dis as m y rapid ly e u No othe ho m es r ombi tio s f g ts that ar ava labl mme ially t d y h ve the eff ct of th e ubstances The dis s in wh h ACTH and the rtisones ha e b en tr ed in suffic nt instan es to w rant the e lu t on a e o tl ed o page 428 l ge er l t can b said that these gents re int rchange abl but oc s nally patient is found t be r pons e to ne f thes h m es and not t th othe

Do ages

Do ag s v y on de bly in ch indiv d l In g e al it i dvisabl to mploy the lowest do e that g ves th desired effect It i gen lly ad *isable to begin with larger d s s and th dec ease* as r pidly as p s bl

A Co tic t opi U S P (ACTH) *Many p pa tion available* (e p g s 424 d 4 5)

B Co tiso e A etate U S P A ail ble under v i s tr d m s (p g 424 d 425)

C Hyd rt n U S P N w a il ble omm r i lly Hydro t e s p b bly th prin ipal st oid lab t d by th d e al c t x It about o d one half tim s as p te t as ortis (e p g s 424 and 425)

D P d i , N N D d P d is lo , N N D Thes A d ri ti of o ti o a d hyd o ti spe t vely h v e tly bee l t du d Fo ge l i ic l se they ppea to be pe ior t th i pa t compo ds bec u th y hib t

CORTICOTROPIN (ACTH) AND CORTISONES

	Mode of Administration	Daily Dose*	Remarks
Corticotropin U.S.P. (ACTH)			
Lyophilized Powder	I.V. Administer in any I.V. fluid by slow drip. For maximum effect give I.V. during entire 24 hour period. May use for 8-12 hours a day	5-40 U.S.P. units	Maximum therapeutic effect. No resistance develops; if it does occur after I.M. injections, I.V. administration is still effective
	I.M. *Administer in saline every 6 hours*	40-200 U.S.P. units	Resistance often develops with continued I.M. use of this preparation
Aqueous Solution	Administer as above, either I.V. or I.M. Prepared by different methods	As above	Resistance may occur, depending on method of preparation
Gelatin Preparations: Repository Corticotropin Injection U.S.P. (Corticotropin Gel)	Give I.M. or subcutaneously every 12 hours *for maximum effect. May use once daily in some patients*	10-200 U.S.P. units	*No development of resistance*
Cortisone Acetate U.S.P. Tablets 5 and 25 mg	Oral administration. Give in divided doses every 6 hours or q.i.d.	25-200 mg or more	Rarely used because of sodium retention. *Rapid withdrawal may lead to hypoadrenocorticism*
Suspension (aqueous) 25 mg/cc	I.M. in doses every 12-24 hours	25-[illegible]00 mg or more	Slowly absorbed and slowly excreted
Eye Drops and Ophthalmic Ointments *0.5% to 2.5%*	*0.5 or 2.5%* solution into infected eye every 1-2 hours; ointment every 2-6 hours	Variable	For local use only
Hydrocortisone U.S.P.			
Tablets 5, 10 and 20 mg	Oral administration. *Give in divided doses every 6 hours or q.i.d.*	20-200 *mg* (avg. 40-80 *mg*) or more	Similar to cortisone clinically and *metabolically and about 1½ times potent on a weight basis. It [illegible] is in Addison's disease*
Eye Drops 0.5, 1, 2.5% ([illegible] phosphate)	As cortisone acetate eye drops (see above). May combine with antibiotics	Apply locally as needed	For allergic and inflammatory skin and eye conditions. Many preparations combined with antibiotics
Ointment, Lotion 0.5-2.5%	Locally (ophthalm[illegible])		

F I V C e tr te 100 mg in 20 50% l oh l	I V Add to 500 cc or more of saline o gl e	100 200 mg I V	Eme g cy me u e in ab i t o el tive ad al failure Must dissol l at l a t 500 cc ol tl
Hydroc ti o hemi c ci te (S l Co t f®) 100 mg	Dissolve in 1 10 c wate Admin ist I V	100 200 mg I V	Water soluble f rm Fo u e in emer g ncies May b dissolved in g ate quantity I V fl id
Hyd orti A t te U S P Aq ou S spen io 25 mg / c	F i tr rti lar i j ction o ly Do t dil t o alt i any w y Dose d pends on joint size Do n t f y t mi dmi ist ati	10 37 5 mg into joi ts	Of valu i lo l ma g me t of h matoid and o t oarthritic joints where i flammation is r lativ ly ut
Hydr co ti e Te ti y B tyl A t te (Hyd co to ® TBA) S e pensi 25 mg /	For intra arti lar ly	10 37 5 mg into joi ts	As hyd o ti o cetat abo Po sibly lo ger du ati n of effe t
Predniso e N N D and Pr d is lo e N N D T blet 2 5 and 5 mg	O l dmi istration Us as hyd o cortisone l	5 50 mg or m e (avg 10 20 mg)	A d ati of corti o a d hydro cortisone Does not ha e sig ifica t sodium retaini g effe t Abo t 4 times as pot t a ti i flammatory effect s p rent drugs Drug of h i
P d i ol Oi t 0 5%	As hyd o rtiso e oi tm t b ve		Ve y ffe tiv nti i fl mmat ry dr g
P d i l acet te su p si n	For i t a ticular us only	10 37 5 mg into joints	As fo hyd o ortisone a t t s spe si (se above)
Fl d tisone Lotions a d Oi t m t 0 1 0 25%	Lo lly to ski s di t d		V y ff cti e anti i fl mmatory drug Very potent E essi e local use m y le d t systemic absorption with m k d di m ret tion (p 16)
Methylp ednisolo e (Medrol®)	Or 1 tablets	4 40 mg o m e	1½ times as pote t as prednisolone No th ppar nt advantages

Do ge m y y with pecific diseas

little if any sodium and water retention yet retain all other metabolic and therapeutic effects Because of their la k of salt and water retention they must be used with even greater c ution for the other hazardous effects of cortisone therapy are still present and a common early sign of o erdosage edema may be absent

E Fl d o ortiso e A et t , N N D Usually used only top cally (see p ge 425) or as supplement for maintenance in Addison s d sease

Duration of Therapy

It appears at p esent that p olonged admi i tration will b necessary and an be employed safely in many cases Where k owledg is available regarding recommend tions fo treatment these are indicated in the t xt

Da gers

Th se ag nts are potentially ery dangerous However with prop r ca tion most of these dangers can be over ome The pr ciple d ngers are that these drugs may ind ce

1 Hyperglyc m a and gl cos ia (diab tog nic effect) This is of m jor significa ce in the early or pot ntial diabet c
2 Marked et ntio of sodium and water with subseq e t edema increa ed blood v lume and hypertension
3 Negati e n trogen bal n e with loss of body cluding bone p ot in with esulti g osteopo osis
4 Potas ium loss with de elopment f a hypokal m c alkalos s
5 Hirsutism and acne (especially d sagreeable in females)
6 Cushi g s syndrome (m y develop with long co ti ued ad min strati)
7 A tivation o prod ti n of pept ulce
8 Lowering f resista c to infecti us ag nts

Cont ol t B Employed to Co r ct r M n m z D g rs

A *Always reduce t dosage as soon as consiste t with the clinical response*

B Du ng th fi st 2 w ks f th rapy the foll wi g sho ld be ca e fully ob erved

1 Blood p ess
2 Weight
3 Initial ompl te blo d cou t r p at as ndi ated
4 Initial sedim tat on rate r p at a indic ted
5 Urinary suga fasting blood s ga if d c ng subst ces are found in the urine
6 Se um pota s um nd CO_2 should be checked c sionally if large d ses of ho mo e a e to be gi en o r m e than several d ys
7 Da ly eosinophil ounts o measur m t of rin ry steroid excret on if a y question of lack of ad enal spo s to or ticotropin arises

C All p tients should b on high protein di t (100+ Gm p ote)

D If edem develops place patient on low odium d t (200 400 mg sodium daily) Merc ial diu etics may be empl y d when strict sodium reat i tion i imp ssibl

E Potassium c lor d 3 15 Gm daily in di d d d e ho ld b

admini ter d f pr l g d us or high do ag is mployed

F In cases of long c ti d admin st at n t sto te one prep a t on (s e p ge 420) i d es of 10 25 mg daily m y be u ed to ounte act the egat e p tein and pota si m bal c

G Do n t stop either d g br ptly There m y b a s ver r bound of th d eas p ocess Al r member th t co t so (hyd oco tisone) c us at phy f the adrenal cortex prob bly through endoge o s ACTH inh bition s dden with dr w l may lead to symptom of Addis n s d s s

C t aindi tions a d Sp al Pr c t s

A St s P t t R g M int Co t oid Patie ts ec ing o t o ds sp i lly th or l p par t o m st b arefully w tch d a d m naged B of the uppress on f endog o ACTH and s bsequent drenal ort cal t ophy th e patie ts e unable to pond n mally to tr sf l s tu tions (g s g ry inf tio t) When ver ucha s t ti occ s s to o ur th do ge f co tis e o hyd o o t s h ld be r i ed and/ p e t ral ortico d nd ACTH g v n If o al co tisone o hydro o tisone n be adm st d t m t be administe d in large do at lea t v y 6 ho s

B He t D Th age t sho ld b us d w th e trem a t n ndividual with dam g d my c di m Th in r e n xt ell lar fl id m y l ad t a di d ompen tion Alw y begin with mall dos a d w th p t ent on low od m d t

C Sev R l Di Thes d g r prob bly c ntr i d ated o ho ld b d w th t m c tio n patie ts with m jo l dam g t d with dema and/o ol gu i

D Pred p it n t P ych i Th se dr g ca s a ns of well b g and e ph i mo t di d ls vi g th m b t some i d vid al (th s p di po d to p y h si) m y d el p an a ut psy hoti p sod whe th d g s dmi ste ed I th e se t hould b t pped or th d e h uld b low ed nd the p ti t ho ld b f lly ob e ed a d prot ct d Pe so s h mm tt d s d nder th infl ce f th d g

E Eff t Thyr id Whe gi f p ol g d p d th dr g may d p s thy d f tion Th m y i hib t the actio f ACTH th ad en l t x d p s bly th act n of orti o e n th ti s e lls of th body

G e ppl m ntal thy o d 65 00 mg (1 3 g) if th dr g e to b give f mo th n 3 4 w ks

F Eff t P pt Ul

1 A t p pt ul a t and at to u of the d gs b e of da g of p f at n o hem rrh g

2 Old p pt ul r Th se ge t t d t act v t l s Th y hould be d in th p e f th di ea e o ly s em rg y d th n o ly with opt m m t ul r th r py

G T b l si A t v o e tly h l d t b cul i s o t a d t to th f th d gs

H I f t Di B au th e drugs te d to lowe re ist an and th fo to p om t d em n ti of inf t n th y m t be s d with ext m a ti e en wh app p i t tibioti a being gi i a y a ute o h o i i f tio

RESPONSE TO CORTICOTROPIN (ACTH) AND CORTICOIDS IN VARIOUS DISEASES

Usually a M rkedly Be ficial Eff ct

1. Rheum tic a thritis
2. Acute rheumatic fev r
3. Rheumatoid spondylitis
4. Still s disease
5. Pso iatic arthritis
6. Acute gouty arthritis
7. Lupus erythematosus (early disseminated)
8. Inflammatory eye dis se
9. Exfoliative dermatitis
10. Pemphigus
11. Various all rgi s
    a. Hay fe er
    b. Ang o eurotic edema
    c. Drug s sitization
    d. Serum sickness
    e. Asthma
12. Trichinosis
13. Neph otic syndrome
14. Ulcerative colitis (acute toxic)

(Only corti one hydrocort sone and supplemental fl drocorti sone are effect ve against Addison s di ase and pa hypop tuit r ism generally O ly pr dnisone and prednisolo e are effective against the adr noge ital yndrom)

Res lts En o ragi g B t Often Only Tr n i nt

1. R gional enter tis
2. Periarteritis nodosa (early)
3. Scleroderma (arly)
4. Dermatomy it s
5. Pso iasis
6. Alcohol sm (?)
7. P lmonary granulomato s (e cept tube culosis)
8. Toxi cytop n as
9. Chron c lymphatic leukemia (no longer responsi e to othe therapy)

T a i nt Effe t Only

1. Acut leukem a (lympho cyt or gra ulocyt c)
2. Multiple my loma
3. Lympho rcoma
4. Hodgkin s dis a (r rely)
5. Hepat tis e pecially hepatic com

No B fic l Effects E tabl sh d

1. Diabetes mellit s (inc ea es insulin req ir me t)
2. Mya th nia g a s
3. C sh g s yndrome
4. Amyotr phic lateral scle o s
5. Prog essive m cular dystr phy
6. Prog e sive mus la atrophy
7. Mult pl scl ro s
8. Co g t ve h a t f ilu e (May be d tr mental in s me case but case secondary to acut carditis may be b nef t d th ough ff ct f hormone on flammat ry l ion)
9. Chr n myel g no s l kem
10. P liomyel tis
11. O teopo osis (m y be d trim ntal)
12. Acute m o yti l ukemi

Chapter 17

NEOPLASTIC DISEASES

SOME SUGGESTIONS REGARDING MANAGEMENT OF PATIENTS WITH NEOPLASTIC DISEASES

S gg ations for Di gnosis

A Early Sympt m tol gy When conside ing th diagno ti possi b lit in patie t w th bs ure sympt matology r m mb r that n opla tic d se s have an a ly atypi l phase i wh ch they ar le s e ly cogni d than in mo d an d cl nical t ges *The importance of early diagno is cannot be overemphasized* Conside n pla ti d ea e in th d ffer nti l di gn si of ll un xplain d illne s p ci lly in p ti t b yo d 45 y s of age Do not con ey thi s spicion of n o pl sti d ea e to the p tient how ver unle s it is n es ry to d s in d to s ur coop tion in compl ting d agn ti t di

B Physi l Ex mi ti I addition to d tailed xam tion f th uspe t d a areas phys l e amin ti n must always incl d c eful sur y of th skin lymph node bd men br sts p lvi o gan and r tum

C In t m tal E amin tion B o hoscopy ga troscopy igm d opy f m y incr s ccura y of rly d gnosi

D Sp i l L bo at ry and X y St d In dditio to C B C urin ly i and tool am n t on the followi g are u eful in th di gnosis f n pl ti dis e

1 Mi ro cop c tud s of sm ar and tis e se tion
   a B opsy of ss ble tumo and/or od s
   b M row biop y
   c Cyt logi l e amin tion by mear t hnics of ll in body fl id (t ans dat and xud tes) and body sec eti ns (gi l bron hial g stric tc)
2 X ray studi Pl in o ontr t stud s of susp cted a ea f evid f p im ry o meta t ti opl sti d se s
3 Ch mic l m thods
   a Blood hemi al studi (e g blood lcium in p athy o d tum s)
   b G t an lysi (e g hyp idity of g t ic anc r)
   c Blood nd u ine en ym t ts (g blood phosphat e in pro t ti c rcinom)
   d Blood ho mon t ts (g blood protein bound odine in thyroid d nom)
   e Ho mon x etion t st (g 17 k to t roid exc et on in d nal tumor)

E Surgical Exploration (e g simple incision thoracotomy or lap rotomy) M y be indicated as a final evaluation measure In many cases the surgeon must be prepared to perform a radical surgical op ration if macroscopic or frozen section examinations indicate malignant disease

F Reexamination *Upon completion of the clinical studies emphatic reassurance of the patient regarding the negative findings is necessary* If findings are equivocal the p tient should be kept under close follow up obser ation with appropriate diagnostic measures

Suggestions for Treatm nt

A Fa tor Infl en ing Cho c of Treatment

1 Nature (inhere t charact r tics) of the giv n neoplasm rate of growth cytol gical characteristics in asi *nese* amenability (e g radi s nsitivity or *radiocurability*) tendency to met stasize and nature *of metastasis*

2 *Age of p ti nt*

3 Physical and emotional status of patient

4 *Patient s ability and/or willingness* to ooperate with the *prescribed th rapy*

5 *Availabil ty of professional and technical facilities*

6 Stage of the tum r at the time the p tient is first seen

7 Location of the lesion Proximity to vit l or tubular stru tures

8 S condary compli ations of the disease Local pre s re symptom hemorrhage syst mic effects *of the primary* lesion and the metast s s

9 Functional c smetic and *psychological eff ts* of therapy

10 *Pat ent s ability to tolerat rad ation therapy (i* tolerance *of solar or other radi tion)*

11 Cost of therapy

B Tre tm nt f B nign Lesions Th physi ian s clinical impres s on of th ben gn cha a t r of lesions must alw ys be v *rified* by b opsy and mi r s opic xamin tion

1 Simpl radication of th tumor by urgi al *technics* (in lud ing urettag and cauteri ation) *is u ually the preferr* d method *of tre tment Radiation techn c m y* oc asionally *be mployed*

2 *General* indications f r emoval of be ign tum rs

a Di gnostic purpos s (possibility of m lignancy)

b Pres ur on vital structur s

c Obstruct ve sympt ms

d Mechanical (static) deformiti s

e Pain or other m *rked discomfort*

f Systemic *effects (g* hormonal)

g *Hemorrhage* (acut or hronic)

h *Cosmetic* purpo es

i Psychological purposes (reass ran e)

3 Mo e extensive surgery Th urgeon must be p epared to perform radi al s rgery if m c o copic appe ran e or frozen section examination indic te m lignant di se

C Treatm nt of M lignant L ion

1 Primary *lesion*

a Complete *eradication* of the p imary l sion by surgical

(including curett ge and auteri atio) or r di tion m thods must b attempt d wh n ver possibl

b Radical surge y Clinical evidence of reg on l meta ta s s may ind c te need for rad cal su gical emoval of the primary tumor and th invol d nod

c Su gic l emoval of the p imary tumor m y still be ind c ted wh n met ta es e ystemic but re growing very slowly (e g thyroid ca cinom)

d Rad ation therapy may b used to ar e t o slow the progress of th d sea if the t mor i radiosen it ve

e Chemoth rapy Se b low

2 Metast ti l sions

a S rg cal ex is on may be of v lu wh n le ons are oli t ry lowly growing painful r when th y prod e other a ute ymptoms (ob t ction etc)

b Rad at on ther py is indicat d if le i are r dio ensiti and p rti ula ly if they r mult ple or dis minated

c Ch moth apeutic m thods m y b mployed using the specific g nt whi h are kn wn to ffect c rtain types of p im y and metast ti t mo s Th g nts e ord nar ly withheld until there i d finit need for sympto- m ti eli f

(1) And g nic and est g i st roids Definit b ne f cial eff cts hav be n ob v d w th th empi ic l u of the e te o ds in ce t in opl ti diseases but much of the work r m n on an perim ntal ba i The du tion of ff ct is unknown *Steroid therapy is never curative and should never replace radical surg ry of operable carcinoma*

(a) E t g ns The d g f th estrog s m st b individ l ed cc ding t the p tient respo s and the to i ty of the drug (anor xi aus di h d rmatiti and ed ma)

(1) Soft tis meta t es from b t car inom (t lungs b in et) T an i nt improv ment o urs i a sm ll p cent ge of eld ly p ti nts In gene l estrog a e ved f r p ti nts 5 or m y s p t the m no pause Give Di thyl tilb t l U S P 5 30 mg (u u lly 10 15 mg) or Ethinyl E t di l U S P 0 2 0 5 mg orally daily Cyclical administ tion (i 40 d y on 10 days off) s omm ded

(2) P st tic in ma nd m t tas s (s e page 309)

(b) And gen M thylt t t on U S P 5 10 mg sublingu lly d ily or Te t t one Prop o at U S P 75 200 mg I M 3 times we kly p r n m y b indicat d fo

(1) C i oma of th cervix or o y Gi s p rti l o omplete r li f f pain fo va iabl pe iods but no obj ctive imp oveme t

(2) Br ast a cinoma Sk l t l meta t e in 15% of c es show imp ov me t but only occasion l imp ovem t is ob ved in soft tis e meta ta s

(2) Nitrogen mustards Although employed with ben fit in certain cases of metastatic carcinoma these agents have proved most beneficial in certain diseases of the blood and lymphatic systems (see page 241)

(3) Mustard lik compounds (TEM TEPA) Similar to the abo e altho gh less toxic (see page 238)

(4) Antimetabolites (aminopterin 6 M P) See pages 233 239

(5) Urethane® See page 239

(6) Radioactive salts Effects are due to radiation rathe than chemical action

3 Wh n none of the above procedures is possible

a Narcotic drugs Liberal but judicious use especially in advanced and terminal malignant disease

b Surgic l measu es

(1) Reli f of specific symptoms Surg cal intervention (e g trach otomy thor centesis parac ntesis *lumb r puncture etc) may be necessary to co trol* progressive or em rgency obstructive or other pres s re symptoms

(2) *Nonsp cific surgical methods* (hormonal modificat on)

(a) Adrenal tomy Bilateral removal of the adren l glands can sometimes prod e a substantial re gression of extensive and wide pread male and fe male mammary cancer Altho gh ther is objective as well as subj cti e evid nce f improvement th relief is most often of t mporary nat re This s t ll larg ly a research t chnic nce it is a major operati e procedure expensive and r quires care ful follow up steroid repla em nt therapy Th use of this p ocedur in the tr atment of other neo pl ms is being i v stigat d but no significant st tisti s ar avail ble at present

(b) Ovarie tomy R mov l of the ovari s has b en d ocat d fo some time as a t e tment fo advanc d breast ancer Tl e result of the op ration are *u u lly tran ient and th lative ff ca y of the* t e tm nt h s be n qu sti ned

(c) Or hiect my C st ation may es lt n ignificant regression of p im ry and se o d y tumo s of the pr stat and mal br ast In p t nt who f il to respond to o ch ctomy subsequ nt adrenalect my may pro e t b ffectiv S bj tive and objective relief may pe si t f r m r than a y ar

D General Probl ms

1 Explan tion to the p tient

a Factors of importance Opini n varie g e tly as to whethe o not it is advisable to inform pati nt that they h e malignant ne pla t di a e Thi m tt r must be individualiz *d and must nat r lly vary with the temp ra* ment int llig n e attitude nd de ir s of th pati nt *Under certain circumstances* it may be nec ssary or advis ble to inf rm the p tie t as to the tru natur of his condition ir espectiv of th above f ctors

(1) If the patient demands an xplan tion of his illnes

(2) If the p tient s economi status r quir s fo ewarning to permit p op disposition of st t tc

(3) If the pati t refuses to ca ry through on a pres ribed d agnostic and/or th peutic r gimen

(4) If the n oplasm is growing elat ely slowly i non inv iv and is re d ly tre tabl

(5) If th p t t xh usts (or th at ns to xhaust) his finance in a s rch f r a cure

b Manner of explanation If explanation is indicated use m ld t ms uch as growth lump o even tumo but in mo t cases t is advi ble to *avoid the term cancer* Be gu rded in st tements as to prog nos s and lean tow ds th optimisti sid *Always offer s me ray of hope* When th clinical situation is not utterly h pele s ch erful optimistic and re as uring attitud m y do much to allay the fe r and ap p h n on of the pat ent and th family

2 Explanat on t the fam ly It is oft n dvis ble to inf rm a near elativ (p fe bly th m te when thi is feasible) of the n t re of th illnes and the p ognosi The qu lifying f t m tion d abo hould be k pt in mind in de iding who how and wh t to t ll

3 P ovis ons for hronic and te minal ar

a Ass stan of social ag n i s In vi w f th ch oni ity nd the p ychologic l and ocio conomic impli tions of th illne s th h lp of a medi l r ocial g y is dvisabl in pp op i t c

b Ho p t l or ursing hom m y b indic ted

c H m If p t t and fam ly d cide on hom are it will b ne s ry to inst t on o m e members f the family in the te hni of administ ation of drugs (peci lly pare teral nar otic)

TREATMENT OF ADVANCED MAMMARY CANCER

	P em nop sal	Postm op usal
EXCISION OF GONADS (OVARIECTOMY) ↓ Elimi t arian fun ti n	Imp m ti f w c B fici l lt ar ly last long than 8 12 m ths Thi m thod is ld m d t th p t tim	E n l s ff cti e th in p m op s l anc
OVARIAN IRRADIATION ↓ Elimin t an function	B f i l lt in f i umbe f t pe iod up to on y ar m Be t lts in b y m t t (69%) and pulmon ry and pl ur l l ion (50%)	Le ff t than in p m op us l an
ANDROGENS ↓ P t l an b li ff t (?) Ovarian pp el	Sympt m ti eli f 66% f p ti t and obj ti imp veme t in o ou and ft ti m last in 20% f p ti t P h p light p olong tion of life w ll p lli tive ff ct	In uff i nt pe i
ESTROGENS ↓ Empi i l ff t	V i bl e po E t g hould p bably b d ONLY 5 m y e aft m op	S bj tive imp m t i bout 60% of and obj ti imp m t in 25% f s P ti t f bly p di g t t tm t m y h om p long tion of lif
ADRENALECTOMY (BILATERAL) ↓ Elimi t p od tion f and g lik and t og lik t ids (P t t m i t l d ti and D O C A aft op tion)	In lli t b	S bj t obj ti mp m t l l mit d umbe f p ti t t d with thi th py l t t E ll t lit m tim

METHODS USED IN TREATMENT OF NEOPLASTIC DISEASES

M hod	M h m (A l S gg)	S gg d) i ion
URGICAL EXCISION	R m l f p im y ond y m ti	C p ll ti f many p lm y tum p lll tion f ympt m ti ond ry t m
RADIATION X y R dium	D t ti f p im ry d y um i	C p lll ti f many p im y ondary t m lymph m t t m , l k mi
R dioa ti S ll R diophosph ru	S l i d , d i f m i	P lycyth mi ve
R ioiodi	S l d , d f t m	P im y and d y f thy d
R d g ld	S l i d d f m t	S os l t m w th fl id m l on
RMONAL MODIFICATION A dr g ns	P ot i an b ll ff t ian pp ion (?)	Ad d an f b t
	Emp l ff t	Ad an d in m f b t and p t l
E t g	Empi l l ff t	A t l uk mi (ly wh d t g th with anti f ll mpoi d)
C i pl C ti d Hyd ti		
Ad l t my	Elimi t p od ti f t t d	Ad d An ff l and m l b t
O i t my O l R di ti	El mi t j fun ti	C f b t
O hl my	Elimi t t ti l fun on	C f m l b t an f p ost t
ANTIMETABOLITES A l f li A id C mpound Amin pt l A M thopt i d Ad opt i	C mpetition with f li id blocki g f yn h l of l i a id y f f m g w h	Ac t l uk mi l port d t be s f l in i l l d m t and lymph m t t m s
A ti amin A d C mp und 2 6 Di mi P in 6 M ptop i (6 MP)	C mp i tion wi h mi d blocki g f ynth l f min id y f t m g ow h	A t l uk mi l p t d t be f l i lai d m t and lymph m tou t m
NITROGEN MUSTARD COMPOUNDS HN_2 [M thyl bi (2 hl oethyl) mi HCl]	Diff ti l t i ity t t m ti	Hodgki di my l f g ld h l lymphocyti l k mi lp ti t i g od g l onditi)
MUSTARD LIKE COMPOUNDS T i thyl m l min (TEM) T i thyl ph ph mid (TEPA)	Diff ti l t i ity t t m ti	Ch l my l g l k mi h oni lymphocyti l k mi H dgki di lymph om p ly yth mi ve
U han	Diff ti l t i ty t tum t	H dgki dis und ff ti t d m lignant m l m , m obl t m , m l ipl my l m
B lf (My)	D p my l p l i	Ch oni my l g l k mi

Chapter 18

VENEREAL DISEASES

SYPHILIS (Lues)

An a ute or chronic d sease caused by infection w th Treponema pallidum It may be eithe ongenital or acquired The acquired form of the disease is usu lly transmitted genitally but may b ac qui ed by extragenital routes

DIAGNOSTIC FEATURES

Primary Syphilis (code No 147)

A Histo y f contact with an inf cted ind vidual 1 8 weeks (u ually 3 4 w eks) prio to appearance of primary le i n

B Primary l sions a e pleomorphic may be singl or multiple and a usually l c ted on the e ternal ge italia although extrag nital ha c a e not rare (10 15%)

C Three or m re carefully perform d dark field examinat ns (on successive days) are n ces ary b fore a final report of nega tive may be m de

D Both compl m nt fixat on (e g Kolme) and p ipitin (e g Kahn) tests should b pe f rm d Quantit tive blood te ts (per form d by a reliable laborat ry) s n they may demonstr te changing tit r are p f rr d for both diagnost c and f llow up purpos s

E Regi nal lymph nod on one or both sid a e oft n rubbery disc ete and n n te d r

S condary Syphil (cod N 013 147)

A Us ally occur 7 10 we ks aft r exposure to th diseas and 2 3 we ks aft appe anc of the prima y l ion

B The e is often evidence of sy temi inv l m nt with f ver gen ralized lymphademt s non pruriti ma ulopapular d rma titis nasopharyngiti laryngiti conjun tiviti alope a arthr lgia muc us p t hes and condyl m t

C Blood tests f syphilis ar almost in riably tro gly po itive

D Cutan us and muco s memb ane les n m y how T ponem pallid m on dark field examination

E Spinal fluid usu lly shows trans ent involv m nt

Relapsing Syphilis

A Usually occu s within 6 months to 2 years aft r onset of th diseas

B Oft n foll ws in dequate or imp oper ther py (e g p nicillin for co ist nt g orrh a)

C Bl od t sts for yphilis u ually revert to a positiv r t on or if al e dy positive to an incr asing s ologic titer (based upon q ant t tive blood t ts)

D Rel p e may be of s veral clini al type The mmon st of th e e muc utaneous C N S o ula and s ol gical (th latter in the absence of lin al evid nce)

L t t Syph l s (cod No y00 147) (Early latent l ss than 4 years l te late t more than 4 y ars)

An int rm diate o qu sc nt phas afte secondary lesion h v disappe ed and wh le t rti ry ymptoms ar not yet vide t

A Lat nt yph lis ffe s no lin al vid nc of lues othe than the p sit ve blood test It is th r fo e impo tant to r le o t f is positiv blood test the m st common aus s f whi h are technical o cl ic l er ors acute f ers y ws infe tious m n n cleos s m la ia l p osy l ishmani s mallpox v c inat ns lymph granulom v er um syst mi lup s ery th m tosus th r oll gen dis es and biol gi fal e positi e re to

Never make a diagnosis of latent syphilis solely on the basis of a single blood test Rule out the possibility of the above factors If the blood test is only very transiently and weakly positiv the diagnosis of lues should be questioned Conversely if the blood test is persistently positive for 3 or more months lues is the most likely diagnosis

B Spinal fluid mu t b ompl tely neg ti

C The treponema immobiliz ti n te t (TPI) and the Tr pon ma pall d m compl m nt f xat on test (T P C F) altho gh n t a il bl fo outin u e will d stinguish bi log fal e po ti e ea t o s f om t e syphilit re ctions and ho ld be m ployed in all i st i s f do btf l diagnosis

L te (Te t ary) Syphilt (od N 014 147)

I ol m nt m y b diff s m y b c fin d to ert in o gan sy t ms r may be l c li d a di cr te g anulomatous le ions (gumm t) in any and ll ti u

A M c utan ous Gumm t s le i of the skin and mu s m mb an s

B O s Diffu or gummatou l ion of b es nd joints with p i st tis arthritis yn vit and st omyelitis

C Ocul Conjun tivitis iritis v itis horoiditis k ratiti and h ior tinitis

D Vis al (ex lud ng cardiac) Gumm t u or diffu e involv m t f li pan as lung spl en kidn ys and t ma h

E C d v ular

1 Un ompli t d ortiti (od N 481 147)
2 A ti r gurgit ti n (d N 455 147)
3 A u y m (cod No 461 147 6)

F N rvou Sy t m

1 A ymptom ti n ur yphilis hara teri d by spin l fluid b o m liti (G oup I a d II p g 438) b t without e id n e f symptoms or igns of n ur logic l involv ment

Spinal Fluid Findings in C N S Syphilis*

Group and D gr e	w b c per cu mm	Pandy s Test	Total Pro tein (mg per 100 cc)	Complement Fi ation Test	Colloidal Gold Test
I Mild or minimal	8 or more	− or ±	5 50	− or ±	0000000000 to 2 21000000
II Inter mediate or moderate	8 200 or more	± or +	*40 100*	± or + *with 1 cc of fl id*	0012210000 to *3332100000*
III Se re or ma imal (paretic)	8 200 or more	± or +	40 200	+ with 0 1 0 5 c of fluid *(strongly positive)*	55543 1000

Spin l fluid must be n n bloody

a M y be cl ss fied according to C S F changes (see above) as mild *mode ate r ere (Gr ups* I II or III)
b If unt eated may develop into clini al ne rosyphilis May occur during any phase of l s

2 Symptomatic
   a Acute syphil ti m ningitis (od No 912 147 0)
      (1) Usually o curs *within 2 y a s after nfect o*
      (2) Clin al pi tur of low grade meningeal irr t tio
      (3) Spinal flu d Gro p I and II changes
      (4) Often follow inadequate tre tm nt
   b Chronic syphil t meningiti (code No 912 147)
      (1) Usually occu s 2 20 yea s *after infect on*
      (2) Clinical pi t re varies c nside ably ac o ding to porti n of C N S in olved
      (3) Spinal flu d Group I and II changes (see above)
   c Diff e meningova cula lu (od No 910 147)
      (1) Involve both meninges and blood vess l Vascular *thrombose a e f eq ent*
      (2) Clinical p tu e varie w th C N S locat on f throm boses and in lud s both urologi al and p ychi tric manifestations R peat d thrombos s may o cur
      (3) Pr gno s s f ly good w th tr atment
      (4) Spinal flu d G o p I and II hang s oc ur (s abo)
   d Tab s dor alis (code *No 905 147)*
      (1) Usually oc u 2 20 year aft r infecti n
      (2) Involv s d r al spinal c d ots and olumns mid *brain s nse o gans* and auto omic n rvous y tem
      (3) Clinical p tu in lud s ataxia pains of va ying *haracte and lo ation vi ral ri* vi u l dis turbances phin t r and xual disturban e p pil lary chang s ptic atrophy *hypo eflex a dimin ti n* of vibratio and position sense and oth r s n o y disturbanc s
      (4) Spinal fluid G o p I and II chang s occur in the e rli r stages of the di ease changing l te to Group III b normalities *although th* C S F may be om n g tiv (se above)

(5) Blood test for syphilis ar positi e in 50 75% of ca es of tabes

e Tabopa sis (code No 906 147 9) Combines linical features of tabes and pa esis Spinal fluid is v i ble

f Gen ral paresis (dementia paralytica) (code No 00 147)
(1) Usually occu s 2 20 years after infection
(2) A syphilitic meningoenc phalitis
(3) Clinical pict re va i ble b t may include mental d t ioration, person lity and behavior distu bances onvulsi n p alysis w kness tremors pup llary hang sp ech defect hyperrefl xia and other eviden of motor neurone inv l eme t
(4) Spin l fl id Group III changes occur (see pag 438)
(5) Blood t sts f r syphilis are positive i 90 100% of as of p resi

g Opti at phy (od No 962 147 9) Disc pallor visu l f eld dist ban es and altered visual acuity which in un t e ted as p ogr s to blindn ss

C g t l Syph lis (od No 010 1471)
Th lin' al manif st tions of th cong ital dise are quite sim la t thos of the qui ed fo m ex ept f the ath r ind finite lini al ou e and the ab enc of prim ry or initial l ions
A E d n e of fam lial h sto y of l s
B Skin and mu ou m mbrane l ions at birth o in rly infancy
C Cha t st l t st gmata f congenit l lues such a inter st t l k t tis Hut hinson s t th 8th ner e deaf s (H t hins n t iad) s ddl n se hag d sab shin and th bo e chang ment l eta dation tc
D Blood te t fo yphili s s ally strongly p iti t birth but gr d ally be om eg ti e ov a p iod of yea
E Any of th t rt ary e qu la of the ad lt di as (C N S vi ral or di v la) m y o ur

TREATMENT OF SYPHILIS

G e l M

A Public H lth M a s
1 Ln ooper t v and exually p omi c p tie ts w th i f t us lu hould b som how i olated q antin d un til end d n infe tious by pr limin y antilu ti therapy
2 R port th inf t o to app op iat publi health ge y

B G al Man gem nt
1 C fully lu t physical st tus of p tient pri to insti tut on of p ifi th py
A ful phys c l examination ch st ray nd fl r o c py d ti inaly i a d blood ount are dvis bl p o t in tit ti n of til tic therapy Spinal fluid ho ld be m d i all patient with latent or lat lu s p i t th rapy
2 M intai b t p sible ge al he lth by adeq at diet r t r s and c ati n

C Local M as (mu oc t ou l si)
1 Lo l t e tm nt i lly unnec ss y

2 No local antiseptics or other chemicals should be applied to a suspected luetic lesion until repeated dark field examinations have been made. If, after the diagnosis has been established, the luetic lesion should become secondarily infected, the lesion may be treated as for any pyogenic ulceration (this in addition to systemic antiluetic treatment, see page 84)

Prophylaxis

A Sex Education. Instruction along the lines of sexual education is to be desired. Avoidance of illicit sexual contact is the surest of all prophylactic methods.

B Mechanical. The standard rubber condom is effective but protects covered parts only. The exposed parts should be washed with soap and water as soon after contact as possible. This applies to both sexes.

C Antibiotic. If there is known exposure to infectious syphilis, abortive penicillin therapy may be used. Give 1 200 000 units of repository penicillin I M in one dose.

Recommended Treatment Schedules for Various Forms of Syphilis

A Primary and Secondary Adult Syphilis. Repository penicillin 600 000 units I M daily for ten days (6 000 000 units).

B Infectious Relapse. Treat again as for primary or secondary syphilis. Diagnosis is made if careful follow up examination reveals sustained or rising titer on serial quantitative biweekly or monthly blood tests, or if there is actual clinical evidence of relapse (mucous membrane lesions of mouth and anogenital regions and skin lesions, especially on palms, soles and scrotum).

C Latent Syphilis. There are no clinical manifestations in latent lues, and the C S F is negative. The only positive criterion for this stage of the disease is the positive blood test. Only a small percentage of these blood titers, however, will be appreciably altered by treatment with penicillin. The treatment of this stage of the disease is intended to prevent the late sequelae.

D Asymptomatic Neurosyphilis, Benign Late Syphilis, Visceral and Cardiovascular Syphilis. Optimal dosage schedules of penicillin has not been completely established in these stages of the disease. Hazards of penicillin therapy (Herxheimer's reaction or therapeutic paradox) are minimal, but the ultimate outcome of treatment is difficult to determine. The following dosage schedule is recommended: Repository penicillin 600 000 units I M daily for a total of 12 000 000 units.

E Symptomatic Neurosyphilis

1 Prevention of neurosyphilis by establishing early diagnosis and by providing adequate treatment and follow up of early syphilis. Examination of all syphilitic patients for evidence of nervous system involvement must be a regular part of the follow up examination.

2 The pretreatment clinical and laboratory evaluation should include detailed neurological, ocular and psychiatric examination and a cerebrospinal fluid examination. The high rate of coexistence of cardiovascular and C N S lues should be considered.

3 Tre tment m thod
   a P nic llin t eatment Penicillin th tr atment f choice in e osyphilis Repo it y peni illin 600 000 units I M daily to a total of 12 000 000 unit m y be gi n
   b Othe m thod The va io sch dules of metallother py m thods will b omitted her be aus they have b ome ob olet
4 Foll w p examinat on All p tients mu t h ve a spin l fluid amin tion thr mo ths following ompletion of antil etic therapy Th ge ral dequ cy of re po se to tre tme t is at tim s d fficult to v luate (espe ially du ing a sho t period f ob erv tion) but it may b ga ged by clinic l improvement d effective a d p rsi tent re e sal of C S F h ges
   A s cond o r of pen cillin the apy may be gi en f nec s ary

F Pr n t l Syphil s
   1 Mak i a to xpectant pa nt who ar luetic the urgent n cessity for antiluetic therapy *Then make certain that appropriate treatment is carried out*
   2 Imm d t tr atm nt i impo tant Dosage s hedules as ad vised fo primary and econd y syphilis e ati f ct ry When the apy is instituted l te in p egnancy (i after the 7th month) in women with unt e t d early yphil s la ger do e of p n illin e advi ed Do ag s hedules as out lined f ymtp mat n u yphilis and fo via ral or cardi va ular syphili a r ommended R m mb r that p ni illin tre tm t may bring bout cu es in mor than 90% of cas s ven wh n syphili i d s ov d in the l st t i m st of pr gnancy
   3 F llow up m st consi t f monthly phy ical xamination and quantitativ blood ological t st fo syphilis (S T S) unt l and f a month aft d l v ry If th is a y clini al vi d f i p e failu e of f ll f blood S T S tite o a of S T S tit t tme t should b pe t d It is t to b xp ted that th e will n sa ly be a v sal t s ol gi egat vity in moth with late l t nt yphili by any t eatm nt m thod If th moth h pr viously un tr at d o in d q t ly t e t d arly l t t yphilis and the o iginal S T S t t r does ot gn fi antly d line withi 3 month after t e tm t t eatm t advi abl
   4 Th newb n i fant sho ld b ex mi ed f r stigm ta f lu and hould be he ked t 2 to 3 we k int ls for 4 6 m nths If the mat n l blood is po itiv po itive o d blood S T S i f diagn t c al How v if th infant s blood is f ll wed erially by quantitat e blood S T S t 2 w ek inte v ls fo 4 m nths a st ined or i ing S T S titer would indi te a d gno i of ong nital lues and a n ed for tr at m t

Sp i l Con ide tion R g ding Pe illin Th r py
   A H h m ' r t lly f a m ld d g o cu with m k d f equ n y and con ist of f v r and ge erali d ache and p in within 24 h r after o s t of the apy
   B Som clini ians fe l that in lat syphilis it is n c s ry to ad mini t a ou e of bism th and iodide p ior to p nicillin

therapy in order to diminish the hazard of H rxheimer s re action or therapeutic parados These dangers if they exist at all are minimal

C Sensitivity to penicillin (see page 505) contraind cates furth r use One of the other antibiotics may be gi en (see below)

D R lapse following one or more courses of penicillin th rapy r quires consideration of other therapeutic agents

Chlort tracycline (A reomycl ®) Tr atment M thods

Oral Chlortetracycline Hydro hloride U S P (*Aureomycin®*) has been reported to be effecti e in the treatment of syphilis but clinical *experien e with the drug is not exte si e* Optimal dosage schedules tox city failure rates etc rem in to be determ n d One *Gm every 4 hours day a d night for a total of 70 90 Gm* has b en s gg sted its use may be considered in those patients sensi *ti e to penicillin* Tetra ycline *U S P* (*Achromyc n® Tetracyn®*) may be used inst ad of chlortetracycl ne in s milar dosage

DIFFERENTIAL DIAGNOSIS OF VENEREAL DISEASES

Disease *Organism* and How Demo trat d	T st	Lesions B bo	G t l
Syphil s Treponema pallidum (Dark fi ld exam)	Complem nt fixa tion (e g Kolmer) and pre ipitin (e g Kahn) t sts	Non fluctuant	*Painle s* ulcers
Chan roid H moph lu du reyi (Gram stain)	Skin test w th Ducrey antigen	*Usually* fluctuant	*Painful* ulcers
Lymphogranuloma v ner um virus (Culture methods)	Complem nt f x tion tests Frei test	*Usually* fluctuant	*Pain ss* vanescent lcers
Granuloma inguinale Donovan bodie ? (Wright stain)	Non	*Usually* none	*P inl s* spreading ul ers
Gonorrh a (*Gram stain*) N iss ri gono rhoe e	Co nplem nt fixa t on (value?)	N n	U thriti

GONORRHEA

G norrh a is an acute or h onic infe tious di es aused by *th gr m negativ d iplococcus N s r a gonor ho ae* and practi ally always transm tt d among adults by sexual intercourse Acute gonorrh a in th *adult mal s characteriz d by an ute* urethritis with painful rination and purulent urethral discharg Chronic gon rrhea m y be *manifested by chronic inflammation of the ur thra prostate* epididymis and seminal v s cles but rar ly *if ever* of th *upper urinary tract Gonorrhea in the female begins* in the urethra vag na and vaginal glands and is ch ra t rized by painful *urination* and purulent *discharge Comm nly th inf t on spreads to the uterus* t b s and other p lvic structures c u i g abdominal pa n and t ndern ss w th vid nc of onstitutional *symp toms* Systemic *infection* with septicemi and manifested by endo carditis or arthrit s is *less common* Th b s a stron

affin ty f r the ocular mucous m mbran s and may ause a serious and blinding ophthalmia

Diagno is

A H to y of gen t l discha ge and dysu ia oc urring 4 t 10 d ys following s xual int cou se with an infect d ind vidual Symp tom will v ry w th th anatomic tructures invol d Demo stration of the g am neg tive int c llular d plococcus in xu d te f om les ns by st ined (Gram s or methylen blue) m r and by cultur Bl od cultu s may be p sitiv in p tients with ptic mi C mpl ment fix tion te ts m y be posit ve s ver l we ks aft th initi l infection

B M l G nit l Tr ct Involv ment

1 U th tis ut ant r r (cod No 744 103)

a Sm and if nec sary ultu e of mat ial btained from the ur thral me tus will d monstrat the c u ati e o ganism This i obt ined by u thral tripping and n ver by any other method d ring th a ute ph e The d s harge s un er al in the chroni ph

b Two gl t t Acut fir t gla s loudy th s cond i l r Ch both gl sse ontain shr ds Clinic l ymptom re m t oft a ute and d f nit P o t t and em n l v sicl m y b om in l d

2 P ost titis ut (od No 764 103) Ur th al discharg m y o may n t be in reased Sme and cultu finding will be a ab v P in al p in is mmon and inc eas d by d f ti n L w b k pain m y b p ent C n titut onal ymptom u h as f ver and hill m y b p s t Dysu ia is f equ nt and t t n m y o cu

3 A t ep d dym t (d N 756 103) Histo y of c re t ur thr t Sm r and c lture f ndi gs s bov Th e is als t ti ula pain w lling wa mth and dness

C F m l G nit l T t Inv lv me t

1 A t u th t (od No 740 103) Sm ar and (p f bly) ult of u eth l and ginal dis harg sh uld be p fo med Th e i r d s and w lling f v ginal t bul and xt al m atus

2 Ch g o h l unf cti s (aft r 4 6 we k)

V ry ful and p t d cult es and t ined m of m t i l bt in d f om Sk s B th lin or ndo rvi al glands (For te hni s U S P H S VD bull tin 97 1945)

b P lvi infl mm tion (d No 066 103) m y be h a t d by lower q ad ant abd minal t dern s m p t eal r itation and y temic manif tat s

T tm t

P ll st ptomy i hl t t a y l ne (Au omy in®) yt i y l (T mycin®) and th sulfonam d a e all ffe tiv antı g o o al g ts altho gh pe illin i g ally th d g of h

A A ut Ch oni U compli t d U thriti (male o fem l) (od No 740 103) *Av id all local treatment such as irrigati ns manipulations and instillations*

1 Penicillin therapy Several effective technics are available ALWAYS draw p eliminary blood specimen for serological test for syphilis and exami e patient clinically for evid n e of syphilis since the danger of masking early syphilis by pen cillin treatm nt is very real Give repository penicillin 600 000 units I M on 2 successive days
2 Alte nate therapy *If coincident lues is su pected* the abo e treatment should be alt red as follows
   a Penicillin Repos tory penicillin 600 000 un ts I M d ily for 10 days
   b If the patient is all rgic to penicill n give one of the tet acyclin s 1 0 Gm orally Stat then 0 5 Gm at 6 hour intervals for 4 6 dos s
3 Follow up Should consist of e amination of the p tie t at weekly intervals for at least 3 weeks or prefe ably
   a Weekly examination for evid nce of urethral dis harge chancre or rash
   b Stained sme r and if possible culture of any inflam matory exudate we kly *Avoid prostatic massage urethral swabs or instrumentation as a means of obtaining material for examination in acute cases*
   c Blood test for yphilis and examinatio for clin al evi den e of lues at th end of the third week and again at 3 6 12 and 24 months
4 Re tre tment of pe icillin failures (suspect oth r et ology) If any of the we kly hecks shows ba teriologic evid nce of pers stent gono rheal infection peat pe icillin treatment s above Co sid r possibility of rologic ompli atio s If su h can be re sonably ex l d d may treat w th
   a Incr ased dosag s of penic llin
   b Streptomy in S lfate U S P 0 3 0 5 Gm I M as a s gle dose
   c Chlortetr ycli Hyd ochlo ide U S P (Aure myci ®) 1 0 Gm o ally St t and the 0 5 Gm at 6 hour i t rvals for 4 6 do e
   d Oxytetracycli U S P (Te ramycin®) 1 0 Gm orally St t and 1 0 Gm peated in 6 hou s
5 Pers stent failur s Often so c ll d treatme t f il res ar a tu lly re nfect ons this be aus th p bli t large has come to bel that mode n tr tme t methods ha e now rend red the dis s tri al i at The dange s of sucl a conc pt must b made app r nt to the p t t

B <u>Acut and Chronic P st titi</u> (ode N 764 103) T eat as above Hot sit bath and lkaliniz ti n f the rin may pr vide symptomatic reli f

C <u>Acut Epid dymitis</u> (cod No 756 103) Above t eatment in add tion to
1 B d r st
2 Cold ompresses to s r tal reg on
3 Analg sics for relief of pain
4 Suppo t r to be us d during conv l cent mbul tory phas

D <u>Pelvic Inflammatory Dise se</u> (A ute Gono occic Salpingitis code No 787 103)
1 Acute
   a Absolute b d r st

b *No douches or unnecessary manipulation during acute phase*

c Examine c refully for clini l evid e of lues Draw blood for serological te t

d Repository pe icillin 600 000 units I M daily for 5 10 days

(1) Convalesc t period If patient becomes afebrile and asymptom tic ke p her at bed rest until WBC and s dime tati n ate become normal (may take a m th o mo e) Ob erve th pati t d ring and following her next menstrual pe iod for pain and p lvi chang If these a e abs nt dis h rge her to hom c re on the convalesc t program o tlined below

(2) R t e tment If symptoms fe er le kocytosis in creased sedim ntation rate o positiv vaginal smear pe sist or if they r c at th time of m ses ad mi i ter a second o rse of penicillin

e Re tr tment If the patient fails to respond to 2 o rses of peni illin th rapy give on of the tet cyclines 1 0 Gm orally Stat then 0 5 Gm at 6 ho r i tervals fo 4 6 doses

f C nvalescent p ogram Aft the pati nt is discha ged from the hospit l give th following instructions

(1) Sed ntary life

(2) No sexu l int ourse until sign and symptoms h v completely clear d (us ally takes about 6 8 we ks)

(3) Douch s Prolonged dou h s of w rm tap w te usi g 1 2 g llons and admini t ing slowly and gently over a 15 20 minute pe iod o r twice daily Th p ti t can p rform thi procedu most ffectiv ly whil sit ting in th b thtub

2 S bac t (or ut acerbation of chronic f m)

a Absol te b d rest until igns and sympt ms h ve cl ed

b Dou h s as b v

Pe icillin is m h less eff tive in this pha e of the dis as b t trial of th apy is w ant d (s bove)

3 Chroni (hronic gonococ i alpingitis ode No 787 103 0)

B d st d ring te ex ce b tions

b Pe icillin i u lly ineff ti e b t ho ld be t i d Other antibi ti s ho ld al o be t ied

c A o f p lvi di the my tr atme t may be of val e

d S gi l p dures may be dic t d This de ion sho ld b m de by a gyn logi t Re ult of s rg ry ar ot if mly tisfa t ry

GRANULOMA INGUINALE (code No 146 199)

A hr ni t gio dis e ca ed by i f ction with Don ania g anul matis a pl m phic od i t 2 μ in l gth It is manifested by pai l s sh rply defined eddi h err cos and ulce tiv es ily bleedi g d granulomatous i itial l lo f the skin or mu c membra of the g ital egion If unt eated th lesi g ad ually e t d to in ol e the tir ge t l ea d later th adja t as f th abdome and thighs it rarely in lv s deep st t s Th e i usually no lymphad nopathy Le ions ely

C

heal spontaneously although the proc ss may remain stationary for *years* *Deep tissue scrapi gs* or punch biopsy of clean peripheral granulation tissue should be stained with Wright s stain and examined for Donovan bodies (see Table on p ge 442)

Treatment

1 Chlortetracycline Hydrochlo ide U S P (A reomycin®) Oxytetracycline U S P (Terr mycin®) and Chl ramphe icol U S P (Chloromycetin®) are all effective 1 Gm daily for 1 2 weeks may be tried
2 *Streptomycin S lfate U S P is highly effecti b t may be* contraindicated by the danger of d mage to the estibular apparatus If tri d it may be u ed in a dose of 1 Gm I M d ily until the lesio is healed (10 or more day)

LYMPHOGRANULOMA VENEREUM (code No 55 198)
(Lymphogranuloma Inguinale or Lymphopathia Venereum)

Lymphogranuloma v nereum is an a te or chronic venereal disease caused by a specific virus It is characteriz d by minim l herpetiform genital lesions and may b complicat d by regional lymph node involvement and at times by variable const tut onal re actions

The incubation period is one to three weeks In tial lesions are e anesce t o unnoticed he petiform or lcerative a d may appear on any pa t of the ext r l genital area Inguinal buboe ppear 1 4 weeks afte infection are often bilate al nd may o may not be s ppur tive The nod s may fuse soft n and break down forming multiple sin s tracts Ext nsive s arr g may occur Ch onic ano-rectal dise se manife ted by rectal pain s nguinopu lent discharge a d rectal strict res is mo e freq ently enco nt red in f male than in mal patients Co stit tional reactions f qu ntly ac ompany the stage of bubo fo mati n and a e ch ract r ed by feve chills ano rexia malai e and n urological manif tat on Co sid this diseas s a possibility in und agnosed f e s

Th F i skin test (hi k embryo antig n) is of alu if sus picious l sions are of 3 4 we ks du at on a negative re ct o proba bly rules out lymphog a uloma vene m A positiv skin reaction *may* m an a activ inf ction past (old) fe tio o lated viral infecti n (false po iti) The e may b a ve sal of the albumin globulin atio in the rum Complem nt f xation t st ar aluable *Always rule out the possibility of primary syphilis* (se page 436) False positive (usually weakly positi e) bl od te ts for syphilis may occur

Treatme t

A Spec f c Therapy

1 The tetracy lines and Chlo mph i ol U S P (Chloro m c tin®) 0 25 1 0 Gm ($3^{3/4}$ 15 g) orally q d for 5 14 days ar th tre tme ts of hoice
S lfadia i e U S P or S lf thi ole N F 1 0 Gm (15 gr) t i d for 2 3 weeks or lo g r probably ha no effect aga nst the vi us but is effective in p ve ti g se o d ry ompli ations

B Lo al M asu es
1 B d rest (p ovides loc l comfort)
2 Warm fome tations to b boe p r n f r discomfort
3 Analgesi s p r n
4 Aspirat fluctuant nod s und r aseptic pre autions (se be low) *Incision and drainage are to be avoided* (to p eve t lymph tic obstru tions)
5 P octoscopic xamination f r d gnosis and for late evalu at on of hanges
6 Exte siv plastic s rgical r pair operations may b ne es s y in the chronic ano rect l fo m of the disea e R tal st ictur s should b t ated by prolo g d gentle dilation lthough in ext me cases this may b impossibl and colon shunting proc dur s may be neces ry

CHANCROID (Soft Chancre)
(Of Penis code No 751 10x) (Of Vulva code No 774 10x)

A ven eal disea e ca sed by H mophil s d creyi and ma i f ted by p ful g nit l ul er or ul ers often complicated by sup purating i guin l lymph nod s (buboes) Incubati period is f om 3 to 5 d y (ang 2 to 7 d ys?) f llowing vener l e p sure Th g ital l sion begins a a m le o vesicopu t le which r ptu s to prod e a shallow ne otic u d rmined ulcer Singl or multi pl p inful l i ns may occur a d phimosis may result R gion l lymph nodes become nla g d in a f w d ys t 2 we ks a d ar us ally unil te l soft fl ctuant and tend Th nod s may rup tur or may s bsid pontan usly Giemsa st ined smea s f om th l si n r e l H mophilus ducreyi whi h m y also be ult ed f om pus from the l s on of th b boe Syphilis must be exclud d by the di gn stic mea ur s outlined under th di gnosis of syphilis (primary) The tw diseas s m y coexist

T tment
A Sp ifi The apy
1 S lf di i U S P o Sulfiso a ole U S P (G ntrisin®) 1 0 Gm (15 g) q i d f r 1 w k Obse u l p su tio s with the f s lfon mid s (ee p ge 501)
2 Chlortet y lin Hydro hlo id U S P (A reomyci ®) or Oxyt tracy li U S P (T r myci ®) 0 5 Gm ve y 6 hou for 5 7 days

B Lo l Th r py
1 Ca f l l n ing f ul tion with so p and w te b i d (afte di gn sis h bee made) will suffi Wh n le i s fail to h al promptly s ak o c mp sse of 1 10 000 potas ium pe manganate sol ti n may be ss y
2 Fluctuant buboes m y b spi t d with a la g ga g (No 16) edle a indicat d Wa m ompr sses o hot water bottl may be ppli d to th gr in for mf t and to h ten flu t at on o gres i n of bubo

Chapter 19

INFECTIOUS DISEASES

DISEASES DUE TO VIRUSES

MEASLES (Rubeola) (code No 010 169)

An ac te highly communicable virus inf ction charact ri ed by *inflammation of the respiratory tract onjunctiv tis Koplik s spots* and a blotchy rash

The prognosis is g nerally good Seco dary infect on by bac teri is common but responds readily t approp iate tre tm nt The fatality rate of post measle ncephalit s is 30 per c nt and those s rviving f eq ently have res d al damage

Diagnosis

Th inc bation p od i 10 days A p odromal pe iod of fev r co yz and conjunctivitis pre des the rash by abo t 4 days Koplik s spots sually app ar 2 days bef e th ash A blotchy rash appea on th face on th first day sp eads to the trunk on *the s ond and to the extr mities o the thi d and fo th d ys* Leukopenia pres nt

Measl is most contag ous j st before and d ing the p o drome t remains o tagio s but l ss so for about w ek afte th app aran e of th ash

Tr atment

- A Sp cif c M asure None avail bl
- B G ne al M as re
  1. Is lat fo the w k foll wing o set of rash
  2. B d r st until af bril
  3. A pirin as n es ary for analg sia
  4. S lin eye pong s for ymptomati r l ef of conj nctivit s
  5. Vasoconstr cto nos d op
  6. Sedative co gh m ixture if n ss ry (s p 110)
- C Tr atm t of Compl tion
  1. Second y ba ter al inf tion of the m ddle a throat larynx or lu g are t e t d with approp ate sulfonamides or antibiotics (see 514)
  2. Po t mea les enc *phaliti (cod No 930 169) may only b* tr ated symptom t ally
     - a Lumbar pun tu e fo r lief of h da h p r n
     - b Anti onvul ants as ne es ary (s 351)

P phylaxıa

A ti e prophylaxis is n t pract cal but passive p otection or modification may be a complished

A C mpl te tempo ary prote tion of xpos d s ceptibles usually f llow dm nist t o bef re the sixth day of incubation o 20 cc of conv lescent serum 2 to 10 cc of immun serum globulin (gamma glob lın) o 3 to 10 cc of human immune gl bulin (pla ental immun) I M

B Modif cation of the disease followed by p mane t immunity sually ults from the inj t on of half th above doses on th fifth t seve th days qual dos s o the eighth day or d ble doses o the ninth o tenth days following exposure

RUBELLA (German Measles) (code No 010 165)

R bell is an a te mmunıcable dise s of viral origin charact ed by ra h and lymphad nopathy

Diagno is

Th in batio p riod i 2 to 3 weeks A short p odromal period of malais o a hi g in the post ior cervical nodes may p e ede the fi p pula erupti which appears usually fi st n the f e and quickly sp e d to the t unk and ext m ties S boc pital and p st ri cervical ad nitis is ually p esent Leukop nia is ge rally noted Pat e ts a probably infectious d ring th p o d m and du ing the e ptio

T atm t,

A Specific Mea s None

B G I M s Asp in fo m lai if q i d

C *T atm t of C mpli at ons*

1 Fetal bno m lity f q e tly found if the dis a oc urs d ing the f t o ly in the econd trim t of p g n y (S Prophylaxis)

2 En ph l ti (cod N 930 165) d th ombo ytopenic p p r (cod No 516 165 9) e ve y ra Tre t sympt m tically

3 S o d ry t pto oc al inf t on may occur a d ho ld be t t d with p illin (p 461)

P phylaxi

P gna t w m n who h ve b xp d to b lla may b giv n 5 20 f immune s rum globuli (gamma globulin) I M in an ff rt to p ev nt o m dify the di

VARICELLA (Chickenpox) (code No 010 161)

Varic lla is an a ut communi able dı a us d by a virus kin to that of h rp t It i ha act ri d by th e uption of ops of skin l ion

D gno i

Th in batio p iod i to 3 w eks (sually 17 day)

Prodromal symptoms are usually slight and last only one day Lesions erupt in crops and progress through the maculopapula vesicular and pustular stages to crusts in about 3 days The eruption is usually centripetal in distr bution The patie t is in fectious for one day before the onset and for 6 days thereafter Tl late crusts may also occasionally be infectio s

Treatment

A Spe ific M asures None available

B G n ral M a re

1 Isolate u til primary crusts have d sappeared
2 Bed rest until afebrile
3 Cleanliness of skin by frequent tub baths or showers when afebrile
4 Calamine lotion locally and antihistaminics orally may re lieve the prur tus

C Treatment of Compli ations

1 Secondary bacterial nfect on of the l s ons may be treated with bacitra in tyrothricin or penicillin ointment loc lly *If extensive* penicillin I M m y b given
2 Post varic lla ncephalitis may be treated only sympto matically

Prophylaxis

Temporary passive p otection i regularly follows I M admı istration of 20 cc of conval scent s rum but this s rarely warranted

SMALLPOX (Variola) (code No 010 176)

Smallpox is a serio s communicable febrile dis ase chara ter iz d by rapid o s t of constitutional symptoms follow d by an eruption most marked on th fa e and xt emit s and often in ol ing the mu ous memb an s

The prognosis s extremely variable and d pends o several fa tors Previous effective vaccinat on pr vents o modif the infe tion In cases with high fever and in confl ent and h mo *rhagic types* of smallpox the pr gno is is poor The virulence of the virus in epidem cs i quite v riabl If compli at ons a e prei ent the prognosis w rse The amount of s arri g is v r ble but is more marked with secondary infe tion

Diagnosis

The in ubation period i 7 to 21 days The p od omal illn ss lasts 2 to 4 *days* and co s t of feve ext em ba kach and head a he *prost tion* and often v mit g o e throat and o gh Th onset of *the eruption* may be acc mpanied by temp rary d ferv cence Macules are succ eded by sh tty p p l s which b ome vesicles in abo t *3 days* *On* about the s xth day of eruption pu tu lation occurs *folowed* by cr sting after the t nth day Lesions are centrifugally *distribu ed* and ar most d ns on th e f ce and di tal p rts of th *extremities* A r c nt s c ssful va cination us lly excludes the *diagnosis of* mallpox in a suspe t d as Inf tivity is present from just befor the onset unt l the la t c u t l *shed*

Treatment

A Sp c f M ures Hyp immu vaccin a gamma globulin sh ws p om e xpe im tally

B G al Meas es Pen illin has generally favor ble eff t pr b bly due t cont ol of s condary bacterial invad r

C Loc l Mea res

1 M co m mb a Ea ly in th dis as p ovid good o al hygien (se p 5) nd apply petr latum or mineral oil swab to the na es

2 Skin G tl lean g If lesions are conflue t and up p ating t eat a pyode ma (e p 84) Avo d itching by use of nt prurit s (s e p 67) restra t and s d tio m y b e e sa y

D Tr tme t of Compl tion Tr at s i d ated f cond ry inf t ons oth rw s treatm t is ymptomatic C mplicat ons in l de condary infections of the skin mucou memb anes and r sp tory tra t sept emia nephr ti my rd t and va o s n u ological manif tation

P ophylaxis

V inatio (s e p 494)

EPIDEMIC PAROTITIS (Mumps) (code No 621 170)

Mump is n a te nf tio d se s au ed by a pecif vir s whi h most mmonly nv lves th alivary glands b t f e que tly p od c meningo nc ph l ti o hit pa t ti and oph t Th p ogn is s almost alw ys fav bl T sti ul tr phy ually unilate al may f ll w o hit but r ly p od es t rility

D agno s

Th cubati n p d is 2 to 4 w k (sually 18 to 21 d y) Sw ll g of th p t d the l v y gla d i th ommonest manif t t on a d ely a ompanied by s v yst mic mani f st t on H da h nd dr w in s abd minal p in nd t t la p in and welling ually a oc at d w th f v gen lly d n t m ningo phalit (onfirm d by l mb r pun t e) pan r tit nd hit p tively C mpl m nt fixing anti b d s app a d g onval Mumps is p obably nf t o j t b f e th ppea a of w lling and nt l welling d sappea s

T e tm t

A Sp if M N n av ilabl

B G l M r

1 I lat until w lling i g e
2 B d t d ng f b il p od
3 A pi od n f r analg ia if r qui d
4 Alkalin m t sol tion mo th wash s
5 M mp nval s t rum 20 o mumps v l s t gamm globuli 2 5 c l M m yr d e the in denc f hiti in ad lt m l

C T tm n t of C mpli tio Complicatio s ar ally l mm n manif t t on f the di s and t t mpli t o They may p d r o c i th abs of parot tis

1. Meningoencephalitis (code No 912 170) M y be asymptomatic
   a. *Analgesics as necessary*
   b. Lumbar puncture if nec s ary to reduce headache
   c. *If very severe may treat with hydrocortisone as in o chitis*
2. O chitis (code No 755 170)
   a. Suspension of scrotum in suspensory or toweling bridg *s d application of ice bags*
   b. Incision of t nica may be necessary in severe cases
   c. Codeine or morphine as ne essary for analgesia
   d. *Injection of spermatic cord at external inguinal ring with* 10 to 20 cc (2 1/2 5 dr) of 1% p ocal e sol tion
   e. Hydrocortiso e 100 mg I V followed by 20 *mg* orally every 6 hou s for 2 3 days
3. Pa creatitis (code No 690 170) Symptomat c relief only *Parenteral fluids if necessary*
4. Oophoritis (code No 788 170) Symptomatic treatme t only

Prophyl xis

A. Mumps convalescent serum 20 cc (5 dr) I M may reduce *incid nce in expos d s eptibl s*

B. Mumps virus vac ine may prod ce temporary active immunity Intradermal injection of virus ant g n denotes immunity if followed by local ythema

POLIOMYELITIS (Infantile Paralysis) (code No 972 171)

Ac t anterior poliomyelitis is an *infectious highly communi*cable disease caused by any one of three identified type of ne ro tropic viru occ rri g thr gho t most of the world in e demic form and espe ially in th Western world in epidemi form *It* occur with highest fr qu n y in warm s asons The di ase is virtually as prevale t as m asles but mo t infection a inapparent A few produce fev r and e k and b k *stiff* ess with mild transient illness A mall numbe (prob bly 0 1 to 1 per cent of cases) *result in lowe moto ne ron pa aly es usually symmet*rical and of great va iation amo g pati nts Case f tality rates vary according to st ain of vi s q ality of medical ca and degree of immunity i end micity of inf ction in th area *The* gross fatality rate is b low 5 per cent in th United St tes and vari s f om l ss than 5 per cent to 30 per cent in se re se al most all of which have bulbo pinal i ion o high sp nal invol e ment with respiratory paralysis Progn s is in se ere ases de *pe ds largely upon the skill of the ap ti t ams and d q te me*chanical f cilities fo re pi tory assistan e and trach bron hial toilet

Diagnosi (Fo diagnosi of seve e ca e ee p 454)
The i cubation period is a ally 10 to 14 days (ange 3 to p rhaps 30 days) The onset of paralyti di ase may b pr ded by a brief epi od of infl enza like iline s f llowed by app ent recovery then r *current fever* headache ba k he n k stiffness and na sea and vomiting N n pa alytic poliomy litis is diff ult to diagnose with ertainty and is indistinguishable from a vari ty of

Prepared by Leon Lewis M D

as ptic meningitid s In paralytic disease w kness o paralysis may d velop at any tim d ing the febrile phas which ra ely la t long than 7 days Ce ebrospinal fluid show pleocytosis in all b t about 10 per c t of es D ffe ential count is not signif icant pt th t in n paralyti cas s high total counts w th rel ative lymphocyt i s ggest oth dis e spe ially mump P otein m y be slightly l vated and may inc ease d ring th fi st few d ys of ill ss Sugar and chl ride al s a e normal

Viru may be isol ted from th soph ryn and stool for iable pe iods beginni g bef onset of ympt ms (m y be iso lat d a lo g as s ve al w ks ther after f m stool) Spe ific diagnosis is est blish d nly by i olation of the viral agent and d m nstr ti n of an incr a ing tite of neut al zing or mpl ment f xing ant bodi s in blood Se ological t ts ar t yet wid ly av ilabl

T tment (E ly Pha) (For seve a es ee p 454)

A Sp fi M a Non available

B Gen l Me

1 Rest a d supp t
   a T vel a tivity and nneces y exam n tions and p ych t ess hould be a ided
   b P fo m b ief and curs y muscle check not mo e than o c daily in a ut ases Muscl exami at n should not ntail m ul r a tivity on the p t of th pati nt
   c Maintain comfo table but ch gi g po itions in a p l o bed fi m matt e s foot boa d po g rubbe pads rolls sa db g and light splints

2 Reli e pain nd anxi ty
   a Aspirin o aspi in with amphetamine and phenob bital Avoid op tes and oth ba b tu at
   b T anquili g d ugs s ch mep obam te (Eq anil® Miltown®) and m thylphenidyl cet te hydr hlor d (R talin®) m y pr e us ful
   c H t wool pa ks (K nny) to ext mit or pecifi areas d ing f b ile pe iod complete body pa ks only wh n afeb ile

3 M cl sp m Chang of po it extremity p ks a d analges dr g usu lly s ffi e Depot fo ms f t bo u ine may b us d b t their effect h not been uff ently eval at d

4 Bow l ont l D hyd ation and int tinal hypo t vity oft lead t imp ct on Exami f eq ntly Gi e suff ient fluids Us nemas and neostigmin I M if n e sary

5 Bl dd w akn s M y oc with pa alys inv lvi g y m l gr p mo t ommonly with p pl gia
   a Ins t Foley c th te with g at a ptic are
   b Do ot ttempt h mop ophylaxi with nt mi rob als
   c C nne t Fol y c thete with gra ity bottl by st il lear pla ti t be Chang ath te v y fiv d y and re mov as n s po sible
   d T eat p ific urin ry inf tion after identif tio of o ganism and determinati n of en itivity to antimi obial

6 N trition D ing a ly phas and as l ng a bedfast us n ut al a h diet giv a maximum f 0 5 Gm alcium co t t daily (o milk or milk product) and maintai fl id in

take to i s re adequate daily output of low specific gra ity urine (1 5 2 0 liters daily for adult) If nas gastric feedings are necessary utilize liquid m at baby foods juices low calcium soybean milk substitutes lactose and vitamins

Diagnosis (Seve e Cases)

Severe poliomy litis infections threaten life by respiratory m scle weakness impaired airway pharyngeal pa alysis or in volvement of vital centers Diagnos s is made upon appearance of altered breathing pattern development of paradoxical respiration, diminution of vital capacity pooling of pha yngeal secretions change of voice impairment of swallowing dimini hed cough fatigue restlessness lethargy and conf sion in any combin tion or sequence often in association with facial extraocular lingual or masticatory muscle weakness or pper trunk—should r girdle paralysis Upon the appea ance of any of the manif stations of severe involvement the following observations should be mad

A Reco d predicted normal vital capacity and d termine vital capacity at least daily utilizing spirometer ba al metabolism m hine or special ventilom te s

B Note rate of progre sion Prog essive invol ment of muscle gro ps particularly upper trunk shoulder and ne k with per istant fever us ally indicat s fulminati g o r

Tre tment (Severe Cases)

A Specifi M s es None av il ble

B General Measur

1 Mobili tion of personnel and equ pment Symptoms of gra poliomyelitis r quire eme g n y mobilization of medical surgical team and basic equipment tank r spirator prefer ably with posit ve pressure atta hme t trache stomy sur g cal set intrav ou s t (w th polyethylene c th ter and cut down inst me ts) and asp rat g pump

2 Indi ations for tracheostomy Impai ed a rw y from acc m ulat d secretions vocal cord p aly is or spasm (cyan s s deep unconsciousness and convulsions should not be per m tted to occur) pharyngeal pa alysis (impai d swallow ing mechanism egurgitation of fl id through the nose as piration of foodstuffs) rapidly fall ng vital c p ity high f ver and rapid xten ion of p r lysis If b nch scopic examination i pe fo m d t h o tomy ho ld be done with br nchoscope in s t

Artificial spiration is usually necessary during trach eostomy provid by means of oxygen anesthe ia bag hand r suscitator or clini al es t t e g p s tive p ss re devices NOTE Early tra heostomy may be life s ving and may limit exten ion f disease by p ting hypoxia Indication m st be m lib ally const ed with le experienced the apeutic teams With an ext em ly skill d nursing taff tracheo tomy may be avoid d b t risk of surgery is negl g ble in comp ri on with lif aving advan tages Use trans e se incision at the lev l of the cricoid with the neck ext nd d Ins rt t b through first tracheal ring below cri oid *Ne er pe fo m low trach ost my in* poliomyelitis neve incise cricoid

3 Indicatio s f r sp tor
  a Obvio s resp ratory nad qua y fatigue diminish d es piratory u to anxiety and ta hy a dia
  b V tal c p ity below 50 p nt of normal When v tal ap city is 35 pe cent of n mal e pirato u e is m n d to y
  c Child n in p ble of coop ting equ re expe t linical judgme t it s b tt to e r in the dir tion of saf ty Fat g t hy a dia d st b nce of br thing patt rn or lethargy w nt a tr al in a espirat r
4 A ut a e of spi t pat e t with t ach ostomy
  a T h b onch l toil t Use sep te ureth al type nas o l and op n d d bronch al theters S t a pi ator f r maximum pr ss of min s t n inches of me c y (ch ck m te oft with t be pi h d off!) Pla Y t be b tw n p mp t b ng and cath t Intro d e thete w th Y open clos op n e d d i g aspi rat on and w thdr wal Ent ight m in stem br hus by t ni g he d to left and vi ve sa Keep cath t and hand lean maintain ath t in 1 20 000 Zeph i an® daily fresh (unb iled) 5 p r ce t sodium b ar bon t lution Do n t dry theter b fo e l t od ing it int b n hi
  b T rning p gr m Rotat espirator ar g at le st ev ry two hou s Us T delenb g pa gly T rn p t nt manually on pi ator t y at l ast every o half ho t p event d ubit ul s
  Whil trach ost my tub s p supply w th o oliz d air o yg str m ing n buli er n i uit and tt hing op T t be t t heostomy t b ad pt o nn ting with p iti e p s e att hment f used
  d Obt in exp t sult tion t c nt s xp i n d w th r f e pirat y p raly Te hni i mplex P t nts r t st ongly to l k of nf d n of th e in ha g
  e I p ti nts w th esp to y dysrhythm a (t al p aly i) t li mb d endot heal po itive pr y h on sly w th tank to maint in adeq t tidal volum I deper t cas s ar and dmini ter hl pr m azin (Thora i ®) o oth no d pressing ed t v to d ce l at on of e p ato y m s l
  f F r leep s impl n depr s i g sed tiv p fe ably Do mi on® (m thylp rafyn 1) fo tif d by chl rp o mazin o m p barn t Avo d b bitur t !
  g Antim rob als F t eatm nt o (rar ly) hem p ophy l i of pi to y tra t infe t on e p illin o yth omy Avo d b ad sp t m antibi tic to pr v t development of e st t inary t a t inf tio
  h Maintain tidal a qui d fo p t nts r pi ato y r te and weight (Se Radf d et al Nom g am f A ti f ial R pi tion N w E gland J Med 251 877 1954)
  i Av id e p t ry alkalos s by o t ol of t dal ai and ppr p at blood-alv ol ai tudi

C T e tme t of C mpl c tio
  1 Ga t di t ti R l ev by nas g st ic intubation and aspir tio epl l at el t lyte by int enous out

2 Gastric hemorrhage Uncommon, but may cause death Transfuse if bleeding or perforated Curling s ulcer is sus pected Surgery should be undertaken under positive pres s re respiration if perforation is proved
3 Bladder atony and infe tion See page 453
4 Ileus and impaction See page 453
5 Atelectasis Prevent by aerosolization of air stream per iodic deep breaths by increasing tank pressure briefly or special vacuum attachment change of position and preven tion of respiratory infection as well as good trach obronchial toilet If atelectasis o curs treat with positive pressure aerosol the apy bronchodilators wetting agents and if necessary trypsin B onchoscopy is usually ineffectu l unless inspissated secretions are present
6 Me tal changes Psychosis (us ally short lived) with con fusion disorie tation and hall cinations or delusions occur in a small percentage of cases The e may be benef ted by new drugs especially Frenquel® (azacyclo ol hydrochloride) Post acute dep ession is the rule in severe disease It sub sides in 6 8 weeks with supportive psychological care
7 Pregnan y Pregnant women hav a high susceptibility to poliomyelitis and ofte de l p se ere disease Att mpt expectant care until term If at or near term ca ry through labor in respirator Deli er on d tach d respirator tray under positi pressu e respiration with local block or do cesarean e tion Mortality is gligible with a w ll coor dinat d e piratory and ob tet ic prog am Early in p eg nancy spontaneous abortion may oc r or su gical abortion may be necessary Try to avoid proced e until th end of the febrile period

D Conval scence and Rehabilitatio
1 Prin iples Prevent deform ty avoid exercise d ring fe brile period and mobilize arly range of motion and posi tion change d r ng febrile p iod rly acti e ex rci e under skilled direction as s on as feasible
2 Early bracing and splinting for therapeutic p rpo s in ord r to activate therapy p og am NOTE The full gam t f physi al and o cupational therapy individ al and gro p psy chol gy soc al ervi e and appli ation of all m dical spe ialties m y be req i d in th h b litation pro ss

Prophylaxis

A saf and effect k lled v vaccine whi h is antig c for all th ee types of viru s now ava lable and ffici lly r omm ded fo pe so s thro gh age 40 It can be giv n t infant at the same time as DPT o pertus mm i ati Fo hildre or ad lts give 1 cc i ti lly 1 cc afte two to fo r week and 1 cc after s ven or ight m nths A l ec ll inj tio will p obably prove t be nec ssa y

Imm ni ation does ot preve t urvival of th viru i th i tes ti al t act and outb e ks may t ll b ant pat d u cci ated areas Dur ng such outb eaks tr vel fatigu nd o tact with crowds should be mi mi ed

The i c de ce of other eurot op virus infectio s war ants a regime of rest and lo e ob ervatio f all i div d l e pe i lly childre with symptom of mening al irrit t o

PSITTACOSIS (Ornithosis) (code No 010 173)

P ittacos s (ornith is) is haracte d by pneumoniti often migrati g usually associated with ever to emia A history of ontact w th pa rot pa ak ts pigeons or rar ly other b ds i s lly obtainable Di gn si is p oved by olat on of vi s from blood or sp tum of the patient o by rising tit f compl ment fixing antibod e Human to human transfer is ra e altho gh iso lation preca tio s a e wis

T eatme t onsists of giving tetr cyclin drugs or chl am ph ni ol 0 5 Gm every 6 hours orally or 0 5 Gm I V every 12 ho rs f r 10 14 d ys or p nicillin (aqu ou) 100 000 units I M e very 3 ho for 2 weeks Give oxygen and sed tion as required

ENCEPHALITIS (code No 930 1)

Encephalitis m y be a thropod born (Eastern nd W stern equin enc phal myeliti St Louis or J pan e B) post infect o (measle vaccini etc) or of unknown type (von Econ mo s et) S or al d p ess on n ological bnorm litie signs f m nin g al irritation and onvul ons may be ot d Lymphocytos is found in the ebro p nal fluid unassociated w th d reas of a gar o chloride lev l Rising tit r of ompl ment fixing r ne tralizi g antibodi is conf rmato y in the thropod born types a d in mumps n ephalom ningiti

Rep t d l mb r punctures m y elieve ymptoms Prev ntion o a ly tr tm nt of d ubiti p eum nia and urinary tr t inf c t n is important Give anticonvul ants a need d (pp 351 a d 533)

LYMPHOCYTIC CHORIOMENINGITIS (code No 910 160)

Lymphocyti ho iomen ngitis i a vi l inf t on f th ce tral rvo s syst m whi h s linically ind stinguishable f om non pa alyti poliomyelitis o mild enc phalitis The vir s m y b i o lated f m th blood or pinal fluid o diagnos may b confirm d by ising tit of utral ing o complement fixing ant bodi

Incubation p riod s p bably 8 to 21 d y

Tre t fo c phalitis (s e above)

DENGUE (code No 010 162)

Dengu an a te infe t s di e s us d by a vi s trans mitt d by mosquitoe Th in bati n p riod usually 5 to 8 days followi g th bit of an inf t d A des mosquit On et with hillin a hing of h d back nd xt mities o xia and ev re p ostrat Conjun tival inje tion and g nerali ed lymph de pathy may b found Th fev ually last 5 to 6 day and may be of the saddl back form A s a latinif rm or m ulo pap lar ruption occ o the thi d to fifth day nd last up to 3 days Leukopenia is u ually ma ked Fatality i ext em ly ra e

Give salicylates as required for discomfort Permit gr dual restoration of activity d ring prolonged convalescence

Available p ophylactic measures incl de control of mosquitoes by screening and DDT Dengue vaccine shows promise experi mentally

RABIES (code No 010 174)

Rabies is an acute viral infection primarily of animals which is occasionally transmitted to man It is characterized by apathy o hyperexcitability paralysis and invariably results in death

Diagnosis

Th incubation period is usually 2 to 8 weeks (occ sionally as long as 1 year) following the bite of a rabid animal Onset occurs with pain and numbness at the site of inoculation f llowed by d pression irritability and mild dysphagia This is followed by hyperesthesia and mus le spasms particularly of th pharynx Eventually pa alysis and death occu

Treatment

T e tment con ists of bsolut quiet and freedom from stimula tion and sedation as n tetanus fo pre e ti g convulsions No specif c meas res are a ilable

Prophylaxis

A Observation of animal p oducing b t
B Cauterization of wound with fum g nitri a d foll wed by n trali atio of the a d with lim w ter or thorough *washing* with green soap
C Rabies v c ine 2 cc a b ut da ly f r 14 days f llow ng posi tive d agnosis of rab s or following bite by a s p cted animal if animal cannot be ob e ved or f b t is on th he d
D R b es hyperimmun erum should be adm n st red in addit on to va ne in fac al o severe hand b t s

YELLOW FEVER (code No 010 178)

Yellow f ver is n a te infe t o of man and monkeys du to a virus transmitted by A d s mosquito s It is ha a teri d by fever el tive bradycard a i t r and hemo hagi phenom na The mortality rate of yellow fever is qu t va i ble includi g missed ases it is probably 5 pe ent

The incubation p od is 3 to 6 d y The ons t i with chills headache and backa he *The fever oft n d li es tempo arily after* 3 days during which time th pati t s fl shed a d toxic and m y have sev e nausea and vom ting Th onjunctiva a inject d a d the tongue red This is followed by pall chym es bl ding gums black vomit s slight j undic melena album n ria a d prostr t on Leukopeni and r lative b adyca dia are s lly se n

Treatment co sists of gi ing a liq d di t limiting food to high ca bohydrate high protein liquids as tolerat d ntr v no s glucose and *saline* as requi d analg si s and s dativ as r qui d and salin enemas for obstipation

Available p ophyl ctic m as in l d mosquito ontrol by ad quate s eening DDT et V c in i available Giv 0 5 cc bcut

INFLUENZA (code No 010 168)

Infl a s an a ute vi al inf tion of th resp r t y t a t cha acte d by brupt ns t of sy temic d r p rato y symptoms Thr ant g ni st ains of infl n a virus xist (A B C) Mo t p ent inf t ns du to A st ins

In tr atment bed t to ed omplicat ons th most im po ta t con der t on A alg s and dative gh m xtu e may be s d A t b ot ag ts a of o v l e th ap ut c lly o pro phyl t lly a d ho ld be erv d fo treatment of b teri l om pli at su h a pne m n a

P lyvalent nflu n a v u v u e xert mod at tempor ry p te t One should be gi n b ut h tly b fore o at o s t f n infl a pid m pe ally t d bilit t d pe so s

DISEASES DUE TO RICKETTSIAE

The rick tt ia a arth opod born o ganism wh h p od w d sp ead odula thrombou a d c t I ion n the mall bl od v s l a d pilla ies Th v rity of inv lv ment var w th th diff nt p of th ricketts e The s ri nes of the p gn s f epid m typh Rocky Mountain spotted f ver and b typh h s b n gr atly ed d inc the adv nt of pecif c nt b t th py

D gnos

A Typh s Fev (ode N 010 184) I bat p riod 6 to 15 d y Typh f s s d by Ri k tt p owa ki (p dem type) o Ri k tt ia moo ri (mu typ) The forme tran m tt d by body li e the latt by rat fl s Th dis a s milar ex ept that the m ri v ri ty s l ss v On t abr pt w th h ll fever a hi g and pr trat n D lirium t po o oma m y oc r A macular p pula h m hagic rash b gins o th f rth to s venth day ppe r g f st o the t unk and sp d g to the xt miti s ually sp g th f palm and sol Leuk p nia o ly D gnos s m y b onfirm d by compl me t f xation tion o P ote OX 19 aggl tinins appeari g during th d w k

B Rocky M unta Sp tt d F v (od No 010 181) Th in u bat'o period 3 to 14 day Rocky M untain spott d fev is d by R k tt ia kett a d tran mitted by t k bite (p inc pally De m t and oni and D variabil) Pro d om l ympt ms f hillines no xi and mal ise m y The on t of hill f v r h adache photophobi pain th t m ties i ually a dde A r d lat r d ky h mo hagic ma ulopapula r h pp r f st on th w st a d ankl s f m the s ond to ixth days nd xt nd p dly ov r th ent body incl ding the fac palm and

soles Leukopenia is usually present early Complement fixing antibodies and agglutinins for Proteus OX 2 or OX 19 appear during the second week

C Scrub Typhus (Tsuts g mushi Fever) (code No 010-183) The incubation period is 6 to 18 days Scrub typhus is caused by Rickettsia orientalis (R ts tsugamush) and is transmit ed by larval mites An eschar at th area of inoculation is omm The onset is sudden with chills fever malaise and cough A dull red maculopapular eruption appears on the trunk from the fifth to eighth days and may extend to the extremities Speci complement fixing antibodies or Proteus OX K aggl tinins appear during the second week

D Q Fever (code No 010 185) The incubation period is 14 to 26 days Q f ver is caused by Coxiella burneti and is apparently acquired from sheep goats and cattle in a manner not yet determined H adache fever cough and stiff neck are common symptoms R peated rigors may occur Pneumonitis or hepatitis may be demonstrated Spe ific c mplement fixing antibodies appear during the second or third weeks

E Ri kettsialpox (ode No 010 187) Ri k ttsialpox is an infection caus d by Rick ttsia akari introdu ed by the bite of a mite A les on which passes through the stage of papule vesicle and eschar precedes the onset of fever chills headache photophobia and muscular soren s by about a w ek A generalized rash which evolves thro gh papular vesicular and crusting stages appears at the onset of fev r or a few days later Leukopenia u ually s pre ent

Tr tm nt

A Sp cif Me u es

1 T t a y line d g 0 5 1 0 Gm o ally e e y 6 hours for 3 to 7 day or 0 5 Gm I V e ry 12 ho s

or 2 Chloramph nicol U S P (Chloromycetin®) 0 5 Gm orally every 6 hour for 2 to 7 days

B G n ral M a res

1 P rent ral fluids oxygen and edation s required
2 Other support ve m asures as needed
3 Delou ing proc dur s mu t be car i d o t fo louse borne infe tions (s e p 92)

Prophylaxis

A Spe if M a ur

1 Typh s v (Cox type) 1 c s bc t twi e at 7 to 10 d y intervals
2 Rocky Mount in spotted f ver va cin 1 0 cc ubcut 3 times at 5 to 7 day i tervals

B Ge eral Me s D lou ing is v ry impo tant l u e borne epid mic typh s (ee p 92)

DISEASES DUE TO BACTERIA

SCARLET FEVER (code No 010 102) and STREPTOCOCCIC SORE THROAT (code No 531 102)

S rl t fever nd streptococ i so e th oat (foll ula t nsil l tis s ptic e throat) a inf cti ns of the fa es by β h mo lytı st eptoco i (Lan ef ld Gro p A) In ca l t fev in add t n c rt in m nif station d to ryth og nic toxın a p s nt pri ip lly the ra h

The m tality te fr m st ptoco ic s e throat nd sca l t f ve n th United St tes is 0 5% or l Rh umati fev is pro b bly mo e common than g r lly pp ted a d m y be appar e t only when s rial el troca diograms a tak n during conva les e

Dagn is

Th inc bat on p od is 2 to 7 days Th ons t is usually ab pt w th chills f ver he da he pain ın th ext m t s o bdo men v miting and so th oat The throat is u ually f ry r d and mode t ly ed m to s Exudat if pres t consi ts f pat hes of whit sh mat i l which m y b ea ly wiped off The rash of s arl t fev con ists of a punctate rythem whi h i d n est i th skin fold of th axılla and gr ın but does not ppe r on the ex ten o su f ce of th upp extremity St awberry tongu and stippling of the soft palate m y b not d Diagno is may be con f med by cult re Sed me tatio te i in r s d a d leuk cytosis i p nt

The d t on of the ınfection varies it m y b p olo g d by a onv l ent rrı state

T atment

A Sp if M s es

1 P nı illın p oc e 300 000 units d ily I M P nıcıll n m t b co tin d 5 t 7 days lap m y o cu Oral pen ll 200 000 u t ev y 6 ho s Ben thin P c llin G U S P (B cillin®) 1 200 000 u its I M m y b ed Loc l p illin by loz ges w thl ss

o 2 Tetr cy lin dr gs 0 25 0 5 Gm very 6 hou s or eryth my in 0 2 0 5 Gm v y 6 h ur is ffe tive but m y be f llowed by bact iol gı al o clinical r laps

3 S lfonamide hav n eff ct on th cours of t ptoco ic so e th oat o rl t f v r b t may p vent complic tion if giv n f r 2 weeks Do ge 0 5 Gm (7½ gr) v y 4 ho with q l or d ble quantities of sod um bi rb nate

4 S let F r St ptococc s Antit xin (9 000 36 000 unit) may be giv n I M with b f t in ve ly toxı se of a let f v r

5 Convales ent e um 25 t 150 c (1 5 oz) may be u ed simila ly to titoxin nd m y be given I V

B G l M es

1 Bed re t until af brıl nd s dim ntatı n rat is n rmal

2 Dı t uited to of th o t

3 Hot salin o 30% gl o ga gl or th oat ir igatıoı 3 o

4 times daily for relief of so e throat

4 Aspirin or codeine as nec assary for symptomatic relief

C Tr tment of Complication

1 Complications due to infection include cervic l adenitis rhinitis si sitis otitis mastoiditis pne monia empyema septic arthritis and septicemia Treatment with penicillin is us ally effective (see p 502)

2 Complicatio s of unknown et ology

a Rhe matic fever may be prevented by e rly vigoro s treatment of the infection with penicillin (see p 518)

b Ac te hemorrhagic glomeruloneph itis (s p 293)

D Treatment of Carri rs 300 000 u its of penic llin proca ne complex daily I M for 10 days or benzathine pe icillin G 1 200 000 units I M usually abolishes the ca r e state

Prophylaxis

A Sca let fever toxin in 5 weekly injections of 500 2000 8000 25 000 and 80 000 units s bc t p e nts the toxic manifestations of sca let fever b t does not prevent streptococcal in f tion

B S lfonamides 0 5 Gm ($7\frac{1}{2}$ gr) b i d penicillin 100 000 units by mouth b i d or benzathac l penicillin 600 000 un ts I M once a month red e th in ide ce of str ptococcal in fect on These sho ld be reserved for ind vid ls with rheumatic lesions to p vent rec rr nce of rhe m t fever

DIPHTHERIA (Pharyngeal code No 631 125)
(Laryngeal code No 330 125)
(Nasopharyngeal code No 318 125)

Diphth ia is an a te infectio s d a e aused by C ry eb c terium diphtheriae and h r cterized by th formati n of a pseudo membr ne at the po tal of t y us ally the respi atory tract and by the activity of exotoxin at dist nt s tes

The mortality rate of d phtheria generally va es betwe n 10 and 20 p ent old nd v duals do poorly and delay of treatm t carries with it a high mo t lity at Myo a ditis pp ari g ea ly is freq tly fatal and d t b nces of conduction or the ppear ance of apid arrhythmias mply el ti ly p o p ogno s However if the p tient s rviv recovery s su lly compl te Neuriti s rarely fatal unl p m m complic te pa alysis of cranial n rves or nless nt costal m l a e pa ly ed S r viving pat ents ecover slowly but ompletely

Diagnosi

Th in b tion pe iod i 2 to 7 d y Symptom d p d o the site of the l sion b t incl d o e th oat na l d s ha g o hoarsen ss accompani d by malai e d low grade f v The pseudom mbra is typ ally g yish h mog n o s a d t n ious Edema and a narrow zon of ythem o d the le i a su lly fo nd Di gnosis is conf med by It I f ctio s m st be assumed as long as C diphtheriae p t in th na opharynx the carrier stat is not uncommon

T tm t

A Spe f M a es

1 Diphtheria ant toxn must be giv n in all ases where diph th ri nnot be e luded by simpl linical examination Th intravenous route pref rable in ll ex ept th mild t ses in those who are nsit to ho se s rum Con jun tival and kin t st for s rum s nsitivity (se p 495) sh ld b don in ll a es and des n itizat n (s p 495) rri d o t if n ss ry Th dose va ies w th th durat on f the di eas th loc tion of the l io and th si of th p t nt A single dos hould uffic

Diphth ia Ant toxin Dosage S hedule

Loc t on	Child	Ad lt
A t i nas l	5000 nits	10,000 un ts
M ld pharynge l	10,000 nits	20,000 units
M de t pha yng l	"0 000 units	40 000 unit
Sev r pha yng l d na ph ryng l	40 000 units	80 000 unit
La yngeal	10 000 unit	20 000 unit
A y two s t o late ca	40 000 units	80 000 unit

2 Peni illin procaine 300 000 units daily p nicillin 50 000 units eve y 3 ho s l rat s slightly the d s p p a anc f th o ganism f m the th at nd cts again t s d ry t ptoco c l inv de it d es not alt r th s of th d phth ria ts lf

B G al Mea s

1 Ab ol t b d est for at l a t 3 we k and until E g is norm l
2 L quid t oft di t as t le ated
3 Hot s line or 30% gl os th oat i igation 3 o 4 times d ily
4 A pirin o od ine s q ir d f p in

C T atme t of Compl at ons

1 Myoca d t (code No 430 125 9) This m y occu at ny tim p t several w ks afte ons t a d m y be as ociat d w th p iph al vas lar collaps Anginal or abdominal pain na e nd vom ting o yn pe may be not d D te rio tion of the mitr l f st h t so nd d op in blood p ure gall p hythm o any a hythmi m y b found Ecg evid n is u ually d m nstrated in rial r ord
   a No d finitiv t atm t i known
   b Oxygen by t nt or m sk may b ne d d Hyp rtoni gl os s l ti 100 of 20% sol tio daily may aid
   d Digitali a d q inid n should be res rved for p d hythmias
2 N itis (cod No 98 125 9) g n ally d s ot begin unt l at le t 3 w ks afte th n t N s l vo e egu gitat n of fluid th ough th os (N IX) paraly i of c mmodation (N III) dy phagia a d dy phonia (N X) nd ra ely involv m nt of oth r ranial n rve us lly pr ed involv ment of

the e t emities which is associated with paresth sias weak ness and depression of reflexes Nasal f eding should be attempted in such cases Corrective splinting and physical therapy may be of aid

3. Respiratory tract obstruction Croupy cough strido and dyspnea ggest laryngeal obstruction
   a. Suction of membrane and sec etions under dir ct laryngo scopy may h lp
   b. Intubation or tracheotomy should be performed before the appearance of cyanosis if the distress increases

D. Tre tme t of Carri rs Penicillin has very limited effect on th ca ier state

Prophyla is

A. Ch ldre Three inj ct ons (0 5 1 0 and 1 0 cc) of diphtheria toxo d (formol alum or aluminum hyd oxid precip tated) at one month intervals during the second 6 months of life (may be combined w th tetan s toxoid and pertussis vaccines) Follow by S hick t st in 3 to 6 months Give 1 0 cc booster t 2 ye rs and at sta t of school

B. Adults
   1. Sen itivity test Molon y s test fo sensit vity to to oid 0 1 cc of 1 20 dil tion of plain to oid int aderm lly Read l ke S hi k test at 24 to 48 ho rs
   2. If Molon y test i egati e proceed as in child en
   3. If Molon y test i positive give 0 1 c of 1 10 dil tion of formol toxoid int a taneously at 3 week int rvals fo 3 doses

PERTUSSIS (Whooping Cough) (code No 350 108)

Pe tussis is an acute ommunicabl infect on of the re piratory tract It is caused by H mophilus pe t ss s a d i charact rized by paroxy mal cough whoop a d bsol te lymphocytosis Until r cently the mortality rat of p rtussis in infants under o e ye r of age wh n th di ase is most ommon was 20 p cent This ha been m t rially duc d with modern antibacte ial therapy Old r child en rarely di of pert ssis

Diagnosi

The incubation period is 7 to 14 days The on t is w th coryza follow d by gradu lly increasing o gh After 1 t 2 we ks the cough becomes paroxysmal esp ci lly at night a d is oft n followed by vomiting Whoops may be heard d ring the paroxysm but are oft n absent or infr que t in young infants Ab ol te lymphocyt sis ap pears du ng the paroxysmal stage The diagno is may be nfirm ed by co gh plate r nasopharynge l swab ultured on Bord t Gengou s medium Infecti s ess gr atest e ly in the di ase and decreas s until the organisms di appe r f om th nasopharynx after ab ut one month

Treatme t

A. Specif c Me s res
   1. Antib oti

a T t y l ned g 25 50 mg /Kg (11 mg /lb) per d y orally
or b St pt mycin 1 0 Gm pe day in di ided doses I M for o e week may b effect v
o c Chloramph nicol U S P (Chlo omy ti ®) 50 mg /Kg *(23 mg /lb) per d y o ally*
o d Polymyxin 2 0 mg /Kg (1 mg /lb) per d y I M i also pr mi ing but thi drug m y be t toxic (ee p 510)
or e E yth omy i 30 mg /Kg /day o lly
2 Hyp mmune s um o hyp immune g mm globulin appear to h ten re ov y prev nt complic t o s and r duce mo tality 20 hyp rimmune s m or 2 5 c hyper immun gamma globulin a given daily or eve y other d y I M f 4 o 5 dos

B Gen l M a r
1 N t t on
Freq nt m ll feeding may be nec ary
b R feed if vomiting occurs sho tly fte a me l
High alori formula by gavag t b may b requi d in infants who fu e to eat
d Par nt ral fluids may b sed to in u e ad qu t fluid intake n s v e ases
2 C gh
a S d tive and exp to ant cough mixtu e a of only light b n fit
b *Atropini ti n to th point of f i l fl hing by in reasing* dos s of tin t e of belladonna v y 4 h urs st rting with o d op oc a nally h lps
Ethe n oil by r t m m y be d in s v e a

C T e tm nt of Complicat
1 C j nct v l hemor h ge tal p laps and umbili al h rni may o cu d to th incr sed p ssu aused by the o gh T t symptomat ally
2 P umo a usually d e t eco d ry invade should be t e t d by hyp immun e m o gamma gl bulin (e bov) pe llin a d sulf nam d or t eptomy in Oxygen i oft n eq d
3 Convul ions may be due to a oxia pet hi l hemo rhage the b ain sub t nc n ephalitis o ce eb al h mor hage If conv lsion re sedati n 100% oxygen inhala tio and lumba p nct may b of aid
4 Otitis m dia should b treat d w th penicillin o ulfona mid Myringotomy may be n essary

P phylaxis
A Pa v prophylaxis f expo d s pt bl may us ally be c ompli hed by the inject n of 20 cc of hype immu serum 2 5 c of hype imm n gamma globulin I M
B Act v immunity may b p od d by th sub t inj tion of a v in ontaining 10 b lli n o ganism p r Th initial dos consist of 1 c a d thi is f llow d at 2 to 4 w ek in t rvals by th s ond and thi d d s of 2 e h V ccin ont ining 30 billion gani ms p cc s al o us d Follow the manuf tu e s inst uction o th packag Immuni tio at 6 m ths of age i th ual p oc d re b t immuni tio t tart d at 2 mo the i p ob bly p f ble Bo ter hots of

1 cc are given at 2 years and wh n starting school The vaccine may be combined with diphtheria and tetanus toxoid Encephalitis occasionally follows pertussis mmunization

MENINGITIS

MENINGOCOCCIC (Epidemic) MENINGITIS (code No 910 104)

Epidemic meningitis caused by Neisseria meningitidis follows a bacteremia from a nasopharyng al foc s locali ing in the meninges Bacteremia acute or chronic may occur without meningitis The overall mortality of epidemic meningitis is 10 per c nt Young healthy individuals and those who reta n cons i ness usually survive

Diagnosis

Th incub tion period is 3 to 7 days Fever chills headache pain in the back abdomen and extr mit es and nausea and vom ti g may be present Delirium stupor or oma appear in s ver cases A petechial rash is comm nly seen The neck is stiff and Kernig s and B udzinski s signs a e pos tive

Lumbar puncture eveals a cloudy sp nal fluid under increas d pressu e usually containing mor than 1000 cells per cu mm w th polymorphonuclears predomi ating The spinal fluid glucose a d chloride contents are decreased and the p otein in r ased Th organ sm is us ally d monst abl by sm ar or culture

Infect vity may b p esent for a few days befo e the appeara e of meningeal invasion b t s qu ckly terminated by therapy Case to ase spr ad s un ommon Healthy ras pha yng al c rri rs a e the common source of spread

Treatment

A Sp cifi M asur s

1 Sulfonamides The agent of choi e

a S ver cas S dium sulf d a ine odi m sulfamera z ne o a mixture of equal p ts of e h or sulfisoxa ole Giv 5 0 Gm (75 gr) in 1000 cc (2 pts) of an electro lyt s lution pr f ably Ringer s lactate solution I V or subcut by ly s at on

b Mild ases Sulfadiazi e ulfam a ine or a mixture of equal p rts of each or sulfisoxa ole Give 3 0 Gm (45 gr) o ally with qual o double amount of sodium b carbonat

c Follow by 3 0 Gm (45 gr) I V or subc t every 8 to 12 hours or 1 0 Gm (15 g) orally very 4 to 6 ho rs as ind cated by s verity G v qual o double doses of sodium bi arbonate o ally with the sulfonamide

and 2 P nicillin

a *Aq eous* penicillin 100 000 unit I M ev y 3 hours

or b Penic llin p ocaine *600 000 units I M* twice daily

3 Antibacterial th apy need only be ontinued on we k

B G neral Measu e

1 Sedat on with paraldehyde sodi m amytal I V or m rphine sulfate as necessary for restles es

2 Restr nts if n cessary f r mark d r stlessness
3 Flu d intak should be at least 3000 c (6 pts) daily and sho ld be sufficient to maintain a u inary output of at least 1000 to 1500 cc (2 3 pt) R pla e fluid l st by vomit ng and give par nt rally *as needed*
4 Feedings (and medi tion) by st mach tube if comatos more than 3 days
5 Lumbar pun ture to be rep ated if evid nc of incre sed intra ranial p ssure pers ts or to he k respons to therapy by cer br *spinal fluid gluco level*
6 *SHOCK* Treat for shock (e p 27) and for a ute adr nal insuff i ncy (e p 382)

C Complic tio and T atm t Myo ard tis and r n l failur are c mmon in eve as s no sp if tr atm nt s available *Cran al nerv lesion (especi lly N VIII) are u ually permanent* Arthr tis requires no treatment other than parac tesis for pain

P ophylaxis
A tot l of 1 0 2 0 Gm (15 30 gr) sulfadiazine ally to ex pos d p rs ns or ca r ers in two doses taken the s me day

PNEUMOCOCCIC MENINGITIS (code No 910 101)
STREPTOCOCCIC MENINGITIS (code No 910 102)
STAPHYLOCOCCIC MENINGITIS (code No 910 105)

Symptoms are simila t th e of m ningococci m ningitis b t a p eding inf t on s us lly prese t and a focu i *often d* m nat able n the lungs (pn um oc i) th middl ear *o sinus* s Th spin l fluid must be ultu d and examin d to determin the usativ gent

T atm nt
A Sp f M asure
1 T at as m ningo o c c m n ngit s (bo e) and also give 10 000 unit of peni llin in 10 physiologi al salin nt th ally n e daily unt l CSF glu os normal
or 2 Aqu ous *peni illin 1 000 000 unit I M* e ry 2 hours
3 Erythromy in 0 5 Gm eve y 6 hours for st phylo oc i m ni giti
4 T tracy line d ugs m y also be ff tive do not combin w th peni illin

B *Gen l M asure Symptomati and upportive*

HEMOPHILUS INFLUENZAE MENINGITIS (code No 910 110)

Thi *form of meningiti may d v lop gradually s ddenly It* ually oc u s in infant l s than 2 y s old Th symptoms are s mila to th of any pu ul nt m ningiti (s p 466)

T atm t
A Spe if M asur s
1 Dihyd o t pt my in (adults 1 0 Gm hild n 250 mg) I M ev y 6 h rs for one w k nd streptomycin 25 mg in 10 c phy i logi al *ll ol t on ntrath cally daily*

until cerebrospinal fluid glucose content is normal
2 Severe cases should also be given a lfadiazine sulfamera zine or a mixture of equ l parts of each 150 mg /Kg body wt (65 mg or 1 gr /lb) per day Give equal or double doses of sodium bicarbonate
3 Hemophilus infl enzae antiserum (Type B) should also be given to patients with delayed response 25 to 100 mg of antibody nitrogen daily I V until serum prod ces quellung reaction
4 Tetracycline drugs 0 5 Gm every 6 hours are of value Chlo amphenicol (Chloromycetin®) is also effective

B General Measures Treat symptoms as they arise and main tain good nutrition and adequate fluids

TUBERCULOUS MENINGITIS
(Leptomeningitis code No 912 123)
(Pachymeningitis code No 911 123)

This disease is c used by spread of the tubercl b cilli from a focus usually in the lungs or in the peritracheal peribro chial or mesente ic lymph nod There is usually a grad al o set of symp toms with listlessness irritability anorexia and f ver followed by headache vomiting night cries convulsions and rigidity of the neck opisthotonos paralysis and coma

Cerebrospinal fl id freq tly xanthoch omic i under in creased pressu e and n stand ng may form a web and pellicle from which organisms m y be demonstrated by smear c lture or guin pig inoculation Cells and protein in reased but sugar and chlorid ar decreased

Treatment

A Specif M asures
1 St ept my in dihydrostreptomycin 30 mg /Kg b dy wt of each per day I M in divided dose e ery 6 to 12 hou s for 5 months Streptomycin 2 mg /Kg body wt int th cally daily for 2 weeks eve y othe d y for 2 weeks a d twice a week f r 2 week (I trath cal th rapy probably s unneces sa y if isoni id u ed)
and 2 Isoniazid (INH) 10 mg /Kg b dy wt per d y d vided int 2 o 4 doses fo one ye r
or 3 Aminos li ylic a d (PAS) 3 to 5 Gm e ry 6 ho rs by mouth or sodium para ami o al ylate 15 to 30 Gm daily I V for ne y ar

B G neral M asu s Tr at symptoms th y arise and maint in good nutrition d ad quate fluids

TYPHOID FEVER (code No 010 115)

Typhoid fever is an infectio ca s d by Eberthella typhosa a d characte iz d by bacter mia ulce ation of th lymphoid ti s e of the small int st ne and generali ed toxemia The m tal ty of typhoid fever varies from 5 to 25% Eld ly individu l do poorly

Diagnosis

Incubati per od is 5 t 14 days A gradu l onset of f v r a d malaise oft ssociat d with o gh or epistaxis is follow d by a per od of 2 o more weeks of sust ined fever and then gradual de ferv s ence R e spots spl nom galy relative bradycardia dic oti pule and pea soup t ol m y be noted Leukop nia is the rul Isolat on of the o ganism from the blood stool or uri or a high or rising titer of aggl tinin onfirms the diagno is

Infect v ty begins with the appearan of E typh a in the stool or urin d co tin es until th o g nism disappea s f om the ex cret wh h occu t varyi g times later Carrie s can be a erio public h alth probl m

Tre tme t

A Sp c f M es

1 Chlo mph nicol U S P (Chl romy tin®) 1 0 Gm e y 4 ho rs by mo th unt l afebr l nd th n 0 5 Gm ery 6 hou (Child en 50 m g /Kg body wt /day follow d by 25 mg /Kg /day whe af b ile) C tin t eatme t for 3 w eks
2 Hydr c tiso 20 mg every 6 hours m y be sed temp rarily in e er ly toxic patients

B G e l M as

1 Pr vention of dec b ti by ca eful bathing skin m s ge and use of r bber d ghnuts over p s u e ar as
2 Ca ful o l hygie
3 In e sed f od intak is imp tant
   a High loric l w r s d e diet (pproxim tely 3600 4800 Cal le per day) (Se diets pp 55 57) Compl t vit mi suppl me t must b ed
   b C leman diet Ab t 1500 C lo ies/lit (1420/qt)

Lact	400 Gm	8 oz
C m	800 cc	12 z
Milk	2800 cc	6 pts

   c Casein hyd olysat formula about 1050 Calo i s/lit (1016/qt)

Cas in hyd lysat	125 Gm	4 z
Milk	1000 c	2 pts

4 Ad quate fluids Par nter l glucos solution may be n c s a ry t ppl me t fluid intake a d maint in u in o tput
5 Dist nsion m y b relie ed by ge tl colonic fl hes a d ab dominal st p s Pit ssin® nd ost gmine m st be sed w th gre t caution beca e of dang of perforati n
6 Dia hea may b ontrolled by bi muth bcarbonat or camph rated tinct e of opium (se p 259)
7 The patie t m st be st ictly isolated and his x reta teril ized until negative st ol cultu hav bee obt i ed

C Tr tment of Complic ti ns

1 Pn umoni (o da y) m y be tr ted with penicillin sul f amid streptomycin, or tetracycline drugs dep ndi g n the etiol gical agent (s p 514)
2 H morrhage is usually manif ted by i c s in pul e a d drop in blood pre s e associat d with the appe rance of gross blood in th stool T n fusio should b us d a r quired

3 Perforation is often accompanied by abdominal pain shock and signs of peritoneal irritation Immedi te s rg ry is required anticipate and treat shock (se p 27) before t is manifest

D Treatment of Ca ri rs Chemotherapy is usually ineff cti e in abolishing the carrier state

Prophylaxis

A Typhoid vaccine (1 billion organisms per cc) 0 5 cc 1 cc and 1 cc at weekly intervals by subcut injection Th s is usually giv n with paratyphoid A and B vaccine I tradermal injection of 0 1 cc at weekly intervals may be used to minim ze unfavorable reactions

B D inking water and milk must be boiled d ring an ep dem c

C Carriers must be rigidly controlled a d not permitted to be food handl rs

PARATYPHOID FEVER (code No 010 114)

This d s ase m y be caus d by either Salmonella paratyphi (pa typhoid A) or Salmonella schottmulleri (p ratyphoid B) nd is clinically simila to typhoid fever Paratyphoid fev r howeve is usu lly mo e abrupt in its onset and usually ns a milder u s than typhoid The different ati n b tw en th se infe tions can only be made by b ct r logical examination

Treatment and prophylaxis are as f paratyphoid fe er

BRUCELLOSIS (Undulant Fever)

B u llo is is an a ute or hroni systemic inf t on d t *Brucella melitensis* (code No 010 1171) *Bru ella abortus* (code No 010 1172) or *Brucella s s* (ode No 010 1173) and is us lly acqu r d by the ingestion of inf ted dairy p ducts or by ont ct with infected me t

Death i not comm n in b ucello is but m y cur from p o longed d bility or subacute ba t ial ndo ard ti The acute stag may terminate spo taneously or may becom chroni Th ch onic form may p rsist for ma y years

Diagno is

A h st ry of ngestion f aw milk o butch ring of inf cted animals is h lpf l Human to hum spr ad does t oc u Fe er may be s ptic sustai d ndulati g low g ad or absent f lo g periods Systemic sympt ms incl de malaise arthr lgia dep es sion and sw ats Sple omegaly may be pre t Leukope ia is the rule Posit ve blood cultu a a di gno ti High or rising tit rs of agglutinati g o complem nt fixi g ntibodi in th p ce of a compatible clinical pict re allow di gnosis Skin t t nd opso o cytophagic index are un eli ble e iden s of active inf ction and the former may induce confu i g t body r sponses

T e tm nt

A Sp cif Tr atme t The ffe ti ss of tetracyclin drugs chlo amph nic l (Chloromycetin®) and di sn

sulfadiazıne ther py h s not b entirely est blished in ch onic b u ellos s

1 Comb tion of t eptomycın 2 0 Gm daily and t tra ycline drugs 2 0 Gm daily is probably the tr tment of ch ice

or 2 Tetr ycli drug orally G ve 50 mg on e the first day 50 mg tw ce th econd d y 50 mg 3 tim s the third day a d 0 5 to 1 0 Gm every 6 hou f r the following 12 to 14 days Sm ll init al d ag avoids Herxheim like rea tion

or 3 Chl amph nicol U S P (Chl omycetin®) 60 mg /Kg body wt (27 mg /lb) o lly in ti lly then 0 25 Gm every 3 hours until f b ile 7 d ys

4 Dihydrost eptomy in 0 5 Gm I M ery 6 ho s for 2 we k ard sulfad a ne s If merazi mixt r 3 Gm (45 g) initially and 1 0 Gm (15 g) y 6 ho for 2 t 3 w eks

B G ral Mea s

1 B d st d ı g a te feb ile stage

2 High vitamin int ke

P phyl xı

A D truction of infect d d ry nimals a d immunizat n of sc ptibl animal

B P steu tio of all milk and m lk prod ts

GAS GANGRENE (code No 12)

G s ga g e e d e to a y of s ve al na obic Clost idi i a occa io al omplicating nfecti n of wo nds which e soiled with d t or f c D itali t n of tissu is sually p ent Fev chills and loc l welli g a ally s n G s bubbl in the ti e may be d monstrat d by x ys Bacte m a may be p es t Ana ob c ltur of discha g from th wo d o bl od confirm the d agn is

T e tm t

A Spec f M s es

1 Peni illi 100 000 unit I M ve y 3 ho rs

and 2 Polyval nt gas gangr e ntit xin 20 000 un t at onc nd p at ev y 6 to 8 hou s

a d 3 Full dos s of sulf d azin sulf m a ine mixt e (ee p 499)

B S gı l M s Ad q t s gic l d brid m nt and ex po f inf ct d e

TETANUS (code No 010 11x)

T ta us is a n rv s yst m i toxi tion ca ed by fixati n of Clo t idium t tani toxin which ent s thro gh an op n wound and inf ts inj r d ti s the dis se is cha act ri ed by t nic n tra t r s of striated m cle

Diagnost

pe iod is 5 d ys t 5 we ks Th fi t symp

toms usually are pain and tingling at the site of inoculation which may be an insignificant wound that has become contaminated with soil This is followed by irritability trismus stiff ne k and ex tremities and spasm of the abdominal muscles Rigidity of muscles risus sardonicus stiff neck rigid abdominal m scles and hyperactive refle es are found Tonic convulsions gradually appear and are precip tated by slight stimulation Fever is variable Death usually occurs from asphyxia o p umonia The mortality *rate of tetanus is approximately 40% A long incubation period* and the delayed appearance of tetanic convulsions are favorable signs

Treatm t

A Specif c Meas e Tetanus antitoxin 60 000 units I V

B Ge ral Meas res

1 Absolute quiet with minimum stimulation
2 Anti convulsant drugs
   a T ib omoeth nol U S P 15 to 25 mg /Kg body wt (^{1}/8 ^{1}/6 gr /lb) rectally every 1 to 4 hours as required to preve t convulsions
   or b Sodium Amytal® 5 mg /Kg of body wt (^{1}/32 gr /lb) I M as req ired
   or c Paraldehyde 4 to 8 cc orally or 10 to 40 cc rectally p r n
3 Curare in oil and beeswax shows exp riment l promise but is not yet established
4 M phenesin (Tolserol®) 1 to 3 Gm orally or 1 to 2 Gm I V (2 to 5% solution) may be combined with ba b turates
5 Intraveno s fluids as required

Prophylaxi

A Tetan toxoid 1 cc in 3 doses at 3 to 4 week intervals follow d by booster of 1 cc at one year and 1 c at time of i ju y

B T ta us antitoxin 6000 units I M in individ als having soil contaminated wounds especi lly puncture wounds compound fractures and powd r b rns A o d nadequate do s

C Adequate d bridement of wounds

BOTULISM (code No 010 120)

Bot lism is a food poisoning caused by the ingestion of p e formed toxin of Clostridium bot linum a d hara t i d by in volveme t of the centr l n rvous syst m specially th bulbar region The mortality of botulism is 60 per ent de th cur ing in f om 20 hou s to 10 day

D agno s

Symptoms appear 18 to 36 hours aft r the ingestion of improper ly sterilized foodstuffs usually home canned W akn ss vertigo ptosis strab sm s dysphagia and dysphonia are usually noted Gastroi testinal symptoms a e g nerally slight or absent nd f ver is not promin nt Us ally s ve al member of a family a in volved De th occurs from resp r to y f il e or p umoni

Treatm t

A Sp ific M as es Botulin s antitoxin Types A and B 10 000 50 000 units I M as soon as pos ible

B Ge l M r s

1 Absol te rest w th fo t of bed l vated to p omote drainage f om re piratory t ct
2 Aspi tio of respi atory tract f q ntly
3 Oxyg n by mask or th te s indicated
4 R pirator a equir d f r r pi atory paralysi
5 I t a e ous fl id s nec ssary
6 Treat compl cati g pneumonia with tib otics if pr t

P phylaxis

A Ad quate st ilization of all c nn d foods
B B iling f hom nned foods before f r 5 10 min tes
C Di a ding or d t ction of ll cans with b lged lids o ja with leaking ings

TULAREMIA (code No 010 107)

T la mia is an inf tion p odu ed by th gr m n gative organ ism Pa teu ell t l e s s whi h is a qui ed by o ta t w th in fect d num ls or by b t of i t (deer fly tc) Lo al ulcer ation and egi al d nop thy pneum nia o s pti emia may b p es nt D gn s s may b conf rm d by isol tion of the o ganism (difficult) by high aggl tinin tit or by skin test The i cubation p riod 2 to 7 day

T eatm nt in add t n to giving ymptom ti and upportiv me s eq d onsists f giving one f th following (1) t t ycl n d gs 0 5 Gm v ry 6 h s orally fo 5 10 d ys (2) st pt myci 2 0 Gm I M daily in d ided do ev y 8 hours f r 5 10 d ys (3) hl mph ni ol (Chlo omy etin®) 0 5 Gm o ally y 6 ho s f r 5 10 d ys

PLAGUE (code No 010 106)

Plagu sed by Past lla p tis s h r ct ized by a painful l l bub with s ound g dema and sev constit tional ympt ms P e moni plag (od No 361 106) res mbl s other e pne monias The diagn is st on s pi ion of xpos re to nfect d ode t d sol tion of th orga m f m lymph node fluid sp t m o blood

T eatm nt consi t of giving dihyd ost pt my in 2 6 Gm da ly I M in divid d do es o tet acy lin d ugs 0 5 Gm very 6 ho and ulf di ine in full dose (p 499) Gi e ymp t m ti and s pp ti m asu as d d

P ophylacti meas o ist of givi g pl gu vacc ne (2 bil lion gani ms pe) 0 5 d 1 0 c at interv l of 7 10 days The patie t s dis ha ges mu t b a efully di I f ted

CHOLERA (code No 010 129)

Cholera is an acute dysenteric d sease caused by i gestion of Vibrio cholerae After a short incubation period of 1 to 4 days a period of p ofound diarrhea ensues us ally accompanied by seve e dehydration electrolyte deprivation and shock Abrupt onset a d prostration are the most important clinical features The organism may be isolated from stools or vomit Spread is prin pally by contaminated water o food

T eatment,

A Sp ific Meas

1 St ptomycin 1 0 Gm every 6 hours I M

or 2 Sodium sulf diazine 5 0 Gm (75 g) in physi logical saline solution I V followed by 3 0 Gm (45 gr) I V very 8 to 10 hours Oral sulfadiazi e may be substit ted when vomiting ceas s

3 Sodium bicarbonate in equal or double doses should be given with the sulfadia ine when the patie t is able to swallow

B S ppo tive and Symptomatic Measures

1 Human plasma and phys ological saline or Ringer s sol tio I V until shock dehydration and an ria are alleviated Large amounts may be required

2 1/6 molar lactate solution may be necessary in severe cases to combat acidos s and to p vent sulfadiazin crystal forma tion in the kidneys Sol tio s ontaining pot s um should be given to eli v hypok lemi after initial shock and de hyd at on are li v d

P ophylaxis

A Chole a vaccine 0 5 cc initially and then 1 0 c subcut after a 7 to 10 day int rval R p at 1 0 cc every 4 to 6 months

B Rigid solation of all cases a d car ful d ontamination of e creta a e mport nt In endemi a all water a d milk must be bo l d and protect v sc ee ing against flies m t be sed

LEPROSY (code No 010 124)

Lep osy s a chro ic d s ase caused by Mycobacterium l prae and characteri ed by a esthetic granulomatous nodules or mac lar skin lesio s Enlargement of nerve t nk may be not d by palpation M scle at ophy may be seen The o gan sm may be b st demon strated by b opsy but nas l sc apings may eveal its p esence

Treatment consists of giving Thi o lfone Sodium N N D (Promizol ®) 0 25 1 0 Gm every 6 hour ally o Gl o ulfone Sodium N N D (Promin®) 4 c I V da ly for 3 weeks f ll wed by an interval of rest for one w ek (co ti u f r prolong d periods) Hemolytic anemia sho ld be g arded agai t by f eq ent blood counts May also treat with Isoni zid N N D (INH) 5 mg /Kg body wt per day in 3 or 4 do s

DISEASES DUE TO SPIROCHETES

(Syphilis d s ssed o p 436)

RELAPSING FEVER
(Louse borne code No 010 1411)
(Tick borne code No 010 1412)

R lapsing fever is characteriz d by recu ing f b ile episode of 3 to 5 days d t on following bite by an infected tick or lo e Diagnosis m y be onfirm d by demonst ation of Borrelia r c r ntia in the bl od on direct examination or by anim l ino ulat o

T e tm t c s st f giving (1) peni illin 50 000 unit I M. very 3 hours or penicillin p oc ine 300 000 units I M daily for 10 days o (2) t tracy lin dr g 0 5 Gm v ry 6 h u s orally Chlor mpheni ol (Chlo omy etin®) or oxyt tr y line (T r mycin®) may be xpected to p ove ff tive G v uppo ti and ymptomati measur as ne ded

LEPTOSPIROSIS (We l s Disease) (code No 010 142)

Spiroch tal ja d cha a te i ed by eve e const t t onal sympt m p p ri skin le ons j und e a d n ph iti A history f onta t w th rat may be obtained (g s w r worke s war ho s men) Da k f ld xaminati n of th bl od o rin e v ling th L pt sp ra t oha mo rh giae o a h gh tite f spe ifi ggl tinin onf m the diagn s s As pt mening ti p eum ti and p t b al fev als c u ed by leptosp a

T tm nt on i t of g ving tet y li drug 0 5 Gm ev ry 6 ho r o ally o peni illin 100 000 nits v ry 3 hours I M How e e th rol of ant biotics in tr atm nt still being debated G v s ppo ti and ympt m t c m asur s as n ed d

RAT BITE FEVER (Sodoku) (code No 010 134)

Rat bit f ver is c sed by Sp ill m min and is charact zed by a re u r nt chanc t th site of inoculation a companied by r gi nal d nit fever a d a m cula rash Th fev s pisod c nd c rrent

T at with p ni illin 100 000 unit v y 3 hour I M p ni illin procain 300 000 nits I M every 12 h s o t t a y line dr gs 0 5 Gm very 6 h Giv s pport ve and ymptom ti m u s as i di at d

YAWS (F ambesia) (code No 010 146)

Yaws an inf tiou di ase p od c d by T eponema pert n e d ha t ri ed by gran lomato s le io s of kin mu ou m m bran s d b Yaw i rar ly f tal

D gno i

Y w s a q ir d by di e t nonv e eal ont ct The moth yaw a pai l papule whi h l te ul erat app s 3 t 4 w ks

after exposure Six to 12 weeks lat r similar secondary lesions appear and last for several months or years Late gummatous lesions may follow Visceral involvement is ra e The Wassermann and flocculation tests are positive and the spirochetes may be demonstrated by dark field examination

Cleanliness of lesions is most impo tant in treatm nt Specific measures consist of giving one of the f llowing (1) pe ic llin procaine 300 000 units I M daily for 7 10 days (2) tetracycline drugs 0 5 Gm every 6 hours for 10 days or (3) dichlorophenarsine (Clorarsen®) 40 mg I V weekly for 3 6 weeks

INFECTIOUS DISEASES OF UNDETERMINED *ETIOLOGY*

VINCENT S ANGINA (Stomatitis) (code No 610 141)

Vincent s angina is an ulcerativ infection of the oropharynx of doubtful et ology Fusiform and spiroch te infection and herpes s mplex virus have been incriminated

Treatme t

A Spe if c Measures (Probably aga n t secondary infection)
   1 Penicillin troch s 5000 units to be sucked consta tly
   2 P nicillin procaine 300 000 units daily I M in se ere c ses
or 3 T tracycline drugs hloramph nicol (Chl romyc tin®) may red ce se ond ry infection (s e pp 507 to 510)

B Gen r l Measu s
   1 Sodium perborat or hydrogen pe oxide mo th washes
   2 Correction of oral hygi ne by a d ntist

INFECTIOUS MONONUCLEOSIS (code No 010 1301)

Inf ct ous monon cl osis is an infe tiou dise se pr bably of viral o igin with prote n manifest t ons th ommonest of which ar sor throat and lymphocytosis D bility is occa o lly prolonged f r months de ths are very re

D agno s

Clin cal symptoms are *xtremely* variable Sore throat fever and m la s are common Lymphad nopathy a d sple omegaly usually occ r Exudate m y be p es nt n the thr at Initial le kopenia is g nerally su c ed d by th appe an of a n r ased number of abno m l appearing lymphocyt s Sheep ll agglutinins generally app r at some time duri g th o se of the di ease b t may be transient Variou rashes may be noted In bation period and pe iod of infectivity a e not e t blish d

Treatme t

A *Specif c Me s re* Many agents have been propo ed as affecting f vo *bly the* ou e *of* the dis as To dat no e have proved effective

B G r l Me s es
1 Bed rest until af brile
2 Analge ia with Aspi in or codeine if required
3 Hot saline o 30% gluco e throat irrigations or gargles 3 or 4 times daily may h lp
4 In sever ly ill patie ts symptomatic relief may be afford d by corticotropin (ACTH) or on of the cortis nes (see p 424)

C Tre tm nt of Compli ation
1 Hepatit s (code No 680 130) myocarditis (code No 430 130 9) or e ephalitis (code No 930 130) may occ r and are tr t d symptomatically
2 Rupture of the pl e (cod No 520 130 5) requires emer gen y ple ectomy Frequent vig ro s palpation of the sple n is unwise

Pr phylaxis
N e

DISEASES DUE TO PROTOZOA

MALARIA

M la ia is n inf ctio s dis e which is ca s d by one of sev al spe ie of p otozoa of the ge us Plasmod um It i ord narily tr nsmitted only by th bit of a m q ito Th re are 3 main sp inf t ng man

1 P iv x (cod N 010 1571) Causes vivax r benign te tian mala a
2 P mal riae (c d N 010 1572) Ca ses q rtan malaria
3 P fal pa m (od No 010 1573) C uses fal iparum r e tiv ut mnal mala i Prob bly the m st dange ous be c u of ts tend y to a s c br l mal i

Diagno i

A Hi t ry Th dise s is chara ter zed by paroxy ms of chills followed by f e d sweating whi h may oc ev ry d y (q otid) ery oth day (tertia) r v ry thi d day (quart n) Th pres nc of un xplain d fever in patie ts in e demi a p esumptiv vid n e f m lari Spe ific a timala ial th py should be used in s h a e even tho gh organisms c nn t be demon t t d Oth wis do not di gn and t e t f m laria unl ss rgani m h b en id ntif d

B Labo t ry E amin tion Th spe if diagnosis i made by finding on o mor sp i of Pla modium in thin and thi k t in d blood sm or bone marr w sm ars

T tm t

Mod rn te hnic of malaria ther py repres t a rati nal ap proa h based pon biol gi al con epts to this dis as These on pts d stingui h a ti s pha e of ch type of malaria requiring pe ial drug th rapy Th princ pal antimala ials and a discussion of e h drug follows

A. Spe ific Measures The follow ng is a description of the avail able a timalarial drugs dosages ind cations and tox city

1. Chloroquine An effective ag nt against all forms of malar a *Treatment of choice for all forms of malaria during acute attack* It will terminate P falciparum infection and prevents relapses of vivax malaria when adm: istered i conjunction with primaquine
   a. Therapeutic dosage sched le
      (1) Oral Chloroqui e Phosphate U S P (Aralen®) 1 0 Gm (15 gr) as initial dose 0 5 Gm (7½ gr) in 6 ho rs a d 0 5 Gm (7½ gr) daily for the next 2 days
      (2) Emergency treatment Chloroquine hyd o hlo ide 0 2 0 3 Gm (3 5 gr) of base I M repeated in 6 hours if necessary Follow with oral therapy as soon *as possible* *It is not necessary to administer this drug I V* since an effective blood level is rapidly attained by the I M ro te
   b. Suppressive do age 0 5 Gm (7½ gr) chloroq ine di phosphate weekly taken on the same day each w ek
   c. Toxicity The are few toxic ymptoms from this drug when gi en i the above mentioned do es Th se are mild h adache p ritus anor xia bl rring of sion m lais and urtic ri If symptoms be om sev re stop drug and give ammo ium chlo ide 4 0 Gm (60 gr) Stat and 1 0 Gm (15 gr) very 4 hours a difi ati pro mote ex ret on of the drug
2. Amodiaq in Hydrochlo de N N D (Camoq in®) closely related to chl roq ine ch mically and pha macologi ally
   a. Ther peutic do age s hedule Give 0 6 Gm (9 gr) of bas first day and then 0 4 Gm (6 gr) daily fo next 2 days
   b. Suppressive th rapy 0 4 Gm (6 g) f base o c weekly
   c. Toxi ity Mild similar to chlo oq in
3. Quini e Oldest pecific antim larial drug Useful in the ac te atta k of all typ s of mal a Pr o to th advent of new ant mal ri l agents q ini w s the d g of hoice in th rapy of mal r a If non of the new and mor ffecti e ag nts re a ailable q inine is st ll a us f l a timalarial *drug in a resti g the a ute ttack*
   a. Therapeuti d s ge h dule
      (1) Quinine Sulf te U S P B P 0 6 Gm (10 gr) t i d or lly for 5 to 7 d y
      (2) Quinin D hyd o hlo de N F B P 0 65 Gm (10 g) in n mal sali glu e sal e mixtu o plasma I j ct I V VERY SLOWLY (not m e th n 50 mg of alt pe m nut) p at n 6 ho rs f ne es ary give o m r than 3 njectio s in 24 hou s May also b administe d by I V drip at the ate of 2 0 Gm (30 gr) n 24 ho r Follow with o al th v as soo as pos ible
   b. S ppressive dosage Q i in ulf t 0 3 0 6 Gm (5 10 gr) daily wh l in endemic a e
   c. *Toxicity* Q ine in the above do ge may a e *cin ho ism* (tinnit v rtigo deaf s head he a d vis l disturbance) i ome i dividu ls (The dr g is a

far less effecti e the p ut a d s ppressi e age t tha som of the n wer and l ss toxic p ep ratio s) The p s ibil ty of bl ckwater fe e a ising d ri g or at the c s tion of th apy app ars to be higher in quinine tre ted ca e

4 Progu il hyd hl ride (Paludrine®) Altho gh not n ef fective ag t for th tr tm nt of th a ut clinic l atta k this is a good suppr s dr g fo all forms of mala ia It h s tende y to p o oke resi ta ce
   a S pp e s v th apy 0 1 Gm (1½ g) daily for p t lly mmun s bj t 0 3 Gm (5 gr) o c w ekly
   b Toxicity Slight Large d s e use n sea vomiting d r h nd m ld h maturi

5 Pyrimethami e (D ap m®) although not recomm ded f the t tm nt f c te linical m la a i a effe ti age t fo pp si e tr tme t S pp e i e is achi ved ag i t P fal iparum inf ction a d metim s again t P vi x
   a S pp e i e the py 25 mg (⅜ g) we kly taken on th s me day of ea h w ek For hildre g v 12 5 mg (³⁄₁₆ gr) we kly (m y b d solv d i yr p)
   b Toxic ty V y low at re mm d d d ge

6 P imaq e Ph sph t U S P R e t work has howr this d g to be the mo t ff ti aga t th t su f m f Pl m d m vi x Thi d g is mpl yed to rad c te the d e th than to tre t th cl nical atta k It will p e ve t elaps in the majo ity of c s
   a D s ge fo th p e tio f r lap 26 4 mg (15 mg b e) daily in gl o d v ded d e f 14 d y ei fo d by st d d tr tme t w th chlo oq pho ph te o am diaq f gi en d i g an te tt ck
   b Toxic ty Clo ely ob rv p t e t d r t tm nt S hemolyti r actio s cu in s me i di id als p rti ularly N g oes W t h for fall of h m globi o d t on n d ell c unt

B G al M res The on p lf c tre tme t f mal t no diffe e t fr n th t of a y othe a t f brile Iln s T at symptoms s th y a is and in tit te mmedi te i d cated m d tion

AMEBIASIS (cod N 010 151)

Am bi s s c te r h ic inf ction a ed by th proto oo E tam ba h st lyti a Alth gh th nf ct o pr m ily in th lon it is ot s l fo othe body tis s to b in ad d The term m bi i i pplic bl to both th syst mi d th l c liz d di e wh r th t m mebic dys t y is p op ly pplied ly wh f k dys t sympt ms e pr se t Th m jo typ s of amebia is m y be la if d a f llows

A Am bi Coliti (Dy nt ry) (od No 660 151)
   1 A t W th d ar hes and othe gast te t al ympt m
   2 Ch o ic With without d l e

B H pati Am bi si
   1 H p tit Ac te s b c t o h o c (ode No 680 151)

2 Liver abscess Acute or chro c (code ho 680 151 2)

C Amebiasis of other organs (uncommon) lu gs b ai etc may be involved

D Asymptomatic amebiasis (carrier state?) may actually be a latent phase of the disease

Diagnosis

A history of exposure to infection in endemic areas or in epi demics is important but remember that there is an almost world wide incidence of the disease A past history of dysentery or diar rhea (especially known amebiasis) is exceedingly valuable

A Amebic Colitis
1 Bloody diarrhea is frequently present during acute phase
2 Stool examination
a Blood and mucus may be present but there is usually comparatively little pus (cf bacillary dys ntery p 276)
b Cysts and/or trophozoites of E histolyt ca should be demonst ated Repeated stool examinatio s of carefully collected fresh specimens are necessary for this
3 Feve and leukocytosis may be present
4 Multiple vague gastrointestinal symptoms may be prese t in the hronic phase of amebi colitis
5 S gmoidoscop examination m y reveal amebi ul erations

B Ameb c Hepatitis d L ver Ab cess
1 Symptoms of dyspepsia m y b prese t
2 Sign and symptoms of adjac nt r ght chest involveme t may be present
3 Liver may b enlarged and is f equently tender and even painful Occasionally a localized mass is palpable when abs ess is p sent Liver fun tion tests may be abnormal
4 Mild to mod rate leukocytosis and f ver may b found
5 Stools do not usually show E hi tolytica
6 X rays may rev al alteration of contour of diaphragm hepatomegaly o right lowe che t invomvement
7 Material (anchovy paste like) may at times be aspirated from ar fully localized abs ess mass

C Am bi sis of Oth r Organ Diagnos s is difficult and is pos sible only by maintaining a high dex of suspic on of specific organ involvement (ba d on clini l m nifestations) in patients w th known or suspe t d mebia is

D A ympt matic Am b as Thi diagnosis m st be reserved fo a es in which rout ne stool xamination r ve l ysts of E histolytica but clinic l findings (ncluding sigmoido copic ex amination) are completely negativ

E Th rap utic T st A therape tic t ial of anti amebi drugs parti ularly chlo oquine or em tin may be w r nted
1 If diagnosis is doubtful aft r ca ef l investigation and ameb asis (specially hepatic) i linically su pect d
2 If fulminant d a rh a is pr sent and di gnos s i clinically suspected but nnot be establi h d and no oth r o ganism c n be found

Treatm nt

A G ne l M as re
1 *Report* case to local health a tho ities
2 Bed rest is requi ed for certa n pa ith frank

dys tery hepatic o oth r non enteric involveme t and *all patients receivi g emetine therapy* (See below)

3 D t

a If diar hea is p esent follow the dietary m asu es as outlin d fo n nspe ific di rhea (see p 258)

b If ther is hepatic di ease follow the d etary measures utli ed d r th management of chr ni hepat c dis ease (see p 281)

c Iron salts ho ld b given if a emia i pres nt (s e p 219)

B Ac te or Ch nic Amebic Dys tery

1 Sp cif d g In the p ence of dys nt ry it is p obably safe to assum that organi ms have invaded extra intestin l tiss es With this n mind n ad qu te co rse of th rapy should in lud not only an gent eff ctive against intestinal form but also a d ug which is effect v in th extra int ti al tis es (ee table b low)

Eff ctiveness of Anti amebic Drugs

	Chlo o quin	Em tine	Ca ba on M llbis®	Vio form®	E yth o mycin	Fum gillin
I t st l O gan m	±	±	+	+	+	+
Ext ainte tinal O gani m	+	+			±	±

Combi at ons of hlo qu ne (o emetin) and an rs nical (a ba s n or Mil bis®) or an iodin cont ining mp und (Vioform®) ar ommonly mploy d If th organisms prov e istant ythromycin or fum gillin an b tri d D ag s e giv n below

Chl roquine Phosph t U S P (Ar len®) 0 5 Gm ($7\frac{1}{2}$ gr) (o 0 3 Gm of th b s) b i d f 2 day follow d by 0 5 Gm ($7\frac{1}{2}$ gr) d ily f 7 to 10 d y

b Em tin Hyd hl rid Inj ct U S P B P 65 mg (1 gr) da ly sub t f r 6 d ys will cont ol a ute symp t m d eradic tes infe ti n in 15 p cent of se Em tin h b en r plac d by less toxi and qually ef f tive g nt su h s hlo oquin (se ab v)

C bar one U S P B P 0 25 Gm ($3\frac{3}{4}$ gr) t i d lly f r 7 to 10 day o Gly obi l N F (Milib ®) 0 5 Gm ($7\frac{1}{2}$ gr) t i d fo 7 day

d Iodo hlorhyd o yq in U S P (Vi f rm®) 0 2 Gm ($3\frac{3}{4}$ g) t d o lly fo 14 d ys

E yth my U S P 15 mg p Kg body w ght d ly fo 10 to 14 d y This ant b ot i ffectiv fo th t tm t f a te am biasi

f F m g ll N N D (F m d l®) 0 5 to 1 mg p Kg body w ght d ly f 10 t 14 days Empl y d f r d ug ef ti a s of hro c am bi s

2 Ev luatio of th py Following ompl tion of th py w it w k s d e mi e tool on th e s c s ive d ys

a If till pos t v epe t bov o r of t atm nt d r exami fo f at ou se

b If n gative giv no f th r treatm nt R e mi stool

at 4 week intervals until a total of 12 specimens have been found to be negative

3 Toxic reactions of the anti amebic drugs

a *Emetine hyd ochloride* *Contraindicated in myo cardial disease* Naus a vomiting muscular we k *ness neuritis myocarditis and prostration may occur* Special observations and p ecautions includ the following
   (1) Bed rest without lavatory privileges
   (2) Blood p essure determination b i d
   (3) Pulse determination q i d
   (4) Daily examination of patient
   (5) Ecg before and after course of therapy
   (6) Withd aw drug in the event of toxicity

b Arsenic containing compounds (Carbarsone Milibis®) *Contraindicated in hepatic disease* *Nausea* vomiting colic diarrhea *and dermatitis may occur* Daily inspe t on for toxic symptoms is necessary Stop drug in event of toxic reaction
Iodine containing compounds Iodochlo hydroxyquin (Vioform®) *Contraindicated in renal disease* Ga trointestinal upsets and d arrhea may o cur Daily *inspection fo toxic effects* (uncommon) is n c ssary Stop drug in vent of reaction and resume aft r few days *with smaller d ses*

C H p t c Amebias

1 M asures fo hepatitis

a Chloroquin Phosphate U S P (Aralen®) s the drug of choice in hepatic amebia s since it has proved to be eff ctive in emetine r sistant cases and is much less toxic Like emetine this drug has rather feeble intes *tinal effects it is therefore necessary to f llow the course* of chloroquine with Vioform® carbarsone or one of the antibiotics notably erythromycin or fumagillin (see above) D s ge Chloroquine dipho phate 0 5 Gm (7½ gr) (or 0 3 Gm of the base) b i d for 2 days follow d by 0 5 Gm (7½ gr) daily fo 12 to 19 days

or b Emetine hydro hlorid injection 60 mg (1 gr) subcut daily for 9 day *if chlor quin is not available or fails* to provide a d si abl th rap tic ffe t

c Erythromy in and fumagillin now unde trial may prove to be equally effective ag inst b th h pat and intestinal amebiasis

d G neral supp rtive measur should b in tituted as f r infectious hepatitis (s e p 279) A 2 we k r st period may be followed by a *ep at o r e of treatm nt* *After* the patient has convale ced f om his hepatic disease *fu ther* anti amebic drug th rapy might be c nsidered in an effort to eradic te th intestinal infecti n

2 M asures for liver abscess

a Treat as for h patitis (s e abov) If pati nt responds to *chloroq ine* or emetine treatment follow p with other amebacides fo a period *of 2 w eks (s e p 481)* A repeat co rs alternating these dr gs may be nece sary after a rest *period* of on w ek

b Small absc ss If patient r is t ea use combined and th n alternat

o met e and othe drug therapy (se abo)

c La g ab e s If pat ent d es not show defi ite spon e to metin o chloroquine t tme t

(1) Co ti e t eatment nd r fully att mpt to localiz ab ce s s te by physical and ray f nding Aspirate under s pt c o d tions (p efe bly op ating room) and epeat a piration if n c ssa y Avoid open dr i age nless absce s is econd rily infe ted

(2) Co t e d ug the py (ee above) until evid n e of both h pat a d intestinal d s se i dicat d

d S condarily inf ted absc ss

(1) If asp rat d mate l r veals pus and o ganisms (by sm ar and cultu) it m y b nece ary to stabl h pen d in ge (by extra ro s app oaches)

( ) Chemotherap uti ag nts sho ld be employed in the e a es (s pp 496 514)

(3) Compl te u se of nt am bic the apy s for hepatit o liv r ab es if ndic ted (ee above)

3 Ob erve fo tox r ct ns (s e p 482)

D Am bi f Oth Org s Sp if c the py as fo ut r h nic meb c dys te y

E A ympt m tic Ameb asis (C r r State)

1 F ll o s Som lin a f l that ameb sis lway ha systemic as w ll s l cal eff ct a d r omme d a full cou s of th py fo a ut o hron c dyse te y (p 481)

2 Sim ple o al mbulatory t e tme t co id ed s tisfa tory by th r lini ans

a Ca ba sone 0 5 Gm (3 3/4 g) t i d o lly fo 7 d y

b V of m® 0 25 Gm (3 3/4 g) t i d o lly f 14 d y

c F ll w p sto l xaminatio sho ld b perf med as fo a t e am b c nf t (s e p 481)

F Follow p Pat e ts sh ld b f ll wed by lim al a d l bo t y e amin t o at l t on oc a on h month fo 3 to 6 months following th apy Exami ation sho ld in l d s g m idos py d study f f h stool on 3 s ss ve d ys (p ef ably at lea t l following aline athar) R pe t ex am nati sho ld be p form d w thin a y a if nec sary Ne d f h moth rapy mu t b ba d pon a tual d mon t a tio of am b the th n me p se ce of ymptom (e g h oni d h a) Con de th po s bil ty f mpli at ons f th di a i e s onda y inf t i t tion of bow l f om ch moth py p y hic traum et wh n pe sistent sympt m a t b t ti t d by labo t ry f ding Avo d ov t e t m t with m ti o oth dr g

GIARDIASIS (cod No 604 155)

G ard is m if st d by e nt pi od s of w tery s m l d o b lky and ft f l m ll ng tool A m ld t h l h i y t tis may o r The p f c d agr i is m de by d m r tion f G dia lambli (i t stin li) n th tool

T atm t con i t of gi ing Quina i Hydro hl id U S P (At b e®) 0 1 Gm (1 1/2 g) t d fo 5 day a d Amod aq i Hyd hl d N N D (C moq ®) ingl d e f 0 6 Gm (9 g)

Repeat if necessary Repeat stool examination after one week to determine efficacy of treatment

TOXOPLASMOSIS (code No 010 1577)

Toxoplasmosis is a disease of man and animals caused by Tox oplasma gondii It is most frequently encountered in the newborn who acquire their infection in utero Active toxoplasmosis is rare in adults altho gh inapparent infections recognized by serologic tests are not uncommon in the general population Infants and young children with the disease show evidence of ch rioretinitis cerebral calcification hydrocephaly or microcephaly and profound psychomotor disturbances Convulsions may occur Little is known of the mechanism of transmission of the parasite from one host to another Clinical diagnosis is most frequently establi hed on the basis of the presence of cerebral calcification and chorioretinitis In fact the latter may be the most important single manifestation of acquired toxoplasmosis For laboratory confirmation the organ isms may be demonstrated in smears of blood bone marrow C S F or exudate from serous cavit es Toxopl sma can usually be demonstrated in laboratory mice following intra erebral and intraperitoneal inoculation of fluids tissues or xud tes Th complement fixation test and the microchemical dye te t of Sabin and Feldman are the mo t useful diagnostic procedures

There is no effective treatment altho gh combined therapy with sulfadiazine and the antimalarial pyrimethamin (Daraprim®) has shown encouraging results in murin to oplasmos s and in a limited number of human inf ctions

DISEASES DUE TO METAZOA

TRICHINOSIS (code No 255)

Trichino is is ca sed by the ing stion of raw or imp operly cooked infe ted po k It can also be traced to other ind viduals who have consumed the s m infected f od The inc bat on period is from 3 days to 4 weeks

Ac te manifestations may be very m ld or m y be f tal Nausea vomiting cramps diarrh a flatulenc and con t pation occ r early and are followed after a f w d ys by feve chills w akness rash periorbital and dep nd nt edema plinter hemorrh ge pain and tendernes in muscles and eosin phili A y c tral or periph eral neurological involvement may be p se t headache is a prom inent feature A delay d rea tion to th t i hinella skin test (not d only after 12 to 24 hours) o cu s e rly in the disea e (3 d to 7th day)

Ch onic infection is manifested by vague weakne and other symptoms referable to multiple organ ystems E sinophilia is often marked Muscle b opsy may demonstrate o gani ms *An immed ate r action to the trichinell skin test (noted afte 5 minutes)* occurs late in the disease (from 17th day on)

Treatment is supportive and symptomati Sev re acute cas s require hospitalization and excell nt n r ing c re Cort otropin

(ACTH) and th co tis es provid effe tiv relief fo the ac te symptoms A ed ct n of the eo inophil count di app arance of fe er and splinter hemo rhages if pr ent and a gener l imp ove me t in the clini al stat of the p tient a e guides which hould be employed to dete mine the efficacy of treatme t In the acute stag t eat with rel tively large doses of either dr g f r the fi st 24 to 48 h ur (see p 423) In th uba ute stag therapy m y ha to be co tinu d f several d ys o w eks t pre ent r currence Dos ag is r d ced k p ng symptoms under ontrol (s e p 423)

ASCARIASIS OR ROUNDWORM DISEASE (code No 650 241)

Infection with Asca is lumb ic ides may s no symptoms or only ill d fi d gast ointestinal and n rvo symptom Occasion ally ge eral ed urticarial eaction may d velop ra ely a caris p e m n may result The specif d agnosi is made by finding th wo m s eggs or d lt wo m in stools or v mitu or by obs r vation of th ad lt worm pas ing from nos or mouth

Treatment.

A H xyl or in l U S P (d g of ch i f ad lts)
1 Init l p gat o G ve 30 Gm (1 o) m gn m s lfat in wate o 240 c (8 o) of ol tion of magn sium cit at th night bef e dr g th apy
2 A light m al is giv n th pre ding ev ning and th n n food until at least 5 hours after t ki g th hexyl esor in l
3 Alcoh l i ont ind at d bef e and d ring t eatment
4 H yl or inol 5 hard gel tin ps les 0 2 Gm (3 gr) (c ysto d) (t tal 1 0 Gm 15 gr) a giv in th morning on an mpty stom h Thes a to b swallowed wh le *not chewed* Do e fo child n Und 6 yea s of age 0 4 Gm (6 g) 6 to 8 y s 0 6 Gm (9 gr) 8 to 12 ye rs 0 8 Gm (12 gr)
5 P rgation Two ho s late giv 30 Gm (1 z) magne ium s lfat in wat r to emov th wo ms f om th b wel Re p t 2 hou s lat if nec y fo pu gatio
6 Stool examination should b mad one w k lat r on 3 c cessiv days t d t rmin eff cy of t tm nt
7 T atment m y be p t d in 3 days if s ry

B P p zi Cit te, N N D (Ant par®) (D g of cho f childr n) Each c of th sy up contai 100 mg p p zin h ahydr t tabl t equ valent t 250 and 500 mg Giv 5 to 7 d y o se as follows (da ly do g s)

Up to 15 lb	1/2 tsp o one 250 mg t blet da ly
15 to 30 lb	1/2 tsp or on 250 mg t bl t b d
30 to 60 lb	1 t p or e 500 mg tabl t b i d
Ove 60 lb	2 tsp o two 500 mg t bl t b i d

C Di thyl arb m in Cit t U S P (H t zan®) G ve 3 to 6 mg /Kg body wt o lly 3 tim d ily fo 7 t 11 days A syrup p pa tion o taining H t a an® powde in a on ntr ti of 30 mg / is e mm d d f sm ll hildr n Admin ist 12 mg /Kg body w ight o e a d y f r 4 d ys or 6 10 mg /Kg body w ight t i d f 7 10 d y Wh H t a an® is u ed fo radi ti of Ascaris lumb i oid s p etre tm t f ting a d post t tm nt pu g tio a n t ne ess y

D Oil of Chenopodium and Tetrachloroethyl n May be used if other preparations are in ffective or not available Caution Tetrachloroethylene stimulates activity of ascaris and may result in bowel obstruction A preliminary course of hexylre sorcinol is advised before using the combined method
1 Follow procedure of treatment as mentioned above for hexylresorcinol
2 Oil of chenopodium 0 3 cc ($4\frac{1}{2}$ m) capsule and tetra *chloroethylene three 1 0 cc (15 m) soluble gel tin capsules* (total dose 3 0 cc 45 m) are given together and followed by purgation as mentioned above

ANCYLOSTOMIASIS OR HOOKWORM DISEASE
(code No 650 243)

Most commonly caused by Necator americanus or Ancylostoma duodenale the disease occurs when a sufficient number of the worms ar present in the intestine It is manifest d by fatigue weakn ss dy pnea palp tation anorexia perverted appet te w ight loss and a mild microcyti anemia Ground itch an erythematous or maculopapula or vesi ular pruritic dermatitis may develop at th site of penetration of the skin by the larvae Spe ific diagnosis is mad by finding the eggs in the stool

Recent work indi ates that symptoms are most ften due to a *coexisting d f cien y disease Correction of the malnutrition by* adequate dietary means and of the anemia by the add tion of iron appears to all viate or remove the manif stations in the absence of spe ifi tr tment for the hookworm infecti n

Treatm nt.
A G n ral Treatm nt Estimation of the need for treatm nt sh uld be based upon quantitativ ounts of the eggs *in the stools* Th re is no indic tion for treating light inf ctions par ticularly after completion of previous the apy It is often im poss ble to completely er dicate the infection
1 Cor ect malnutrition P ovide an adequat protein diet with supplem ntary ron medi ation (see p 219)
2 *Rule out poss bility of oin ide tal ascar asis If ascariasis* is present or wh n diagno ti fa lities a e limit d give preliminary hexylreso inol as pr s ribed for as ariasi (see p 485) Tetrachloroethyl n timulates ascaris acti vity which occasionally results n ntestinal obstruction If large numbers of hookworms are till pres nt following the administration of hexylreso cinol wa t on week following the last dose and give tetrachlo oethyl n

B Specific Tr atm nt
1 Tet hloroethylene *U S P B P (drug of choice) First corre malnutrition and anemia* Tetrachloroethyl n is contrain i at d in pati nts with alcoholi m chronic gastrointestinal disorders sev re constipation hepatic dis *ease and* in pati nts unde going h vy m tal the py Correct these conditions before giving treatme t
a Initial purgation Give 30 Gm (1 oz) magnesium s lfate in water or 240 cc (8 oz) magn sium citrat olution the night before drug therapy

b The meal of the p ding ev ning hould be light no food should th n be taken until the p gat on after tre tm nt has ca sed a copious bowel movem nt Alcohol and f tty foods hould not be taken for at l ast 48 ho rs prior to drug therapy
Tetra hl roethyl th e 1 0 c (15 m) soluble gelatin capsul s (t tal 3 0 cc 45m) should be given in th morning on n mpty tomach
d Pu gation 2 to 3 ho s late giv 30 Gm (1 o) magne s um ulfate in wat to remov worms f om th bow l If no p rgat on r sults within 4 ho rs rep t 30 Gm (1 oz) magnes um sulfat en ma or any m ans to hast n vacuatio
Examine tools a w k later on 3 s ss ve day to d t rmine ff ca y f t e tm nt
f R peat treatme t 2 w ks lat if indic ted
g F ro s ulfat 0 2 to 0 3 Gm (3 5 gr) t d p c may be giv n f r an mia
2 H xylreso in t May be u d if tetra hl ro thyl n is con traind cated ineffe tive o not ava lable (s e p 485)

STRONGYLOIDIASIS (code No 604 256)

Inf ct on w th Stroi gylo d s t r oralis i manif ted by pi gastri di comfo t la ge bow l disturbances watery m oid tools and eo inophilia F v w knes and w ght loss may be p es nt and st ngylo de pn um nia m y occa onally occ r Spe if c diagno is mad by d monstration of motil habditiform larva in the tool (o putum)

Tr tm t ons ts of giving ge tian olet 60 mg (1 gr) e h u a c t d until 3 3 Gm (50 gr) have b taken L 1½ hou nt oat d tabl t Old hildr n should re e v dult do Young childr a daily d g f 10 mg (1/6 gr) f ach y of ppa ent (not hronological) age not xc ding adult dos Fo fra tory a 25 of a l per e t queous l t on of genti n viol t medi nal powd m y be intubat d t ans d od nally Red e dosag by 1/3 r t mporarily dis ontinu t e t ment f any f the following e p es nt ev e piga tri di om f t p rs t t ev e na s a and/o vomiting o violet d s lor tio of ine

ENTEROBIASIS OR OXYURIASIS (code No 604 242)
(Pinworm o Seatworm)

Inf tion with pinw ms u s pe sist t and oft ve e perin al p ur tus u ually m t int e at night and f qu tly in f ting veral member of a hous hold o in titution it oc u most ommonly in childr n Th are oft n variabl vague ga t oint tinal nd n rvous symptom Th pe if diagnosis is m d by dem t atio of th ggs of Ent ob us (Oxyuris) v mi u- l i n th pe anal o pe ineal kin (S t h® ellul tape o oth w b hni) Egg ar not mmonly found in th stool

Treatm nt

A G al Measures

1 Examine for and treat all infected members of the family and other groups of close contacts since r infection from non treated contacts is frequent

2 Instruct patient and/or household members with respect to
   a Careful washing of hands with soap and water after defecation and again befo meals
   b Keeping fingernails trimmed close a d clean
   c Volunta y abstinen e from scratching of involved areas
   d Apply carbolated petrolatum to anal region following every defecat on Tho oughly wash an 1 gion in morning with soap and wat r
   e Daily morning showers or stand up bath with soapy water
   f Scrubbing of toilet seats with soap and w t r daily
   g Cleaned boiled bed lin ns 2 times weekly
   h Use of paj mas (or sleep rs for children) to preve t manu l contact w th a al region d ing night
   i D scourage patients from putti g ha ds i mo th
   j Raise temperature of sleeping rooms as high as poss ble fo one ho daily then a r tho oughly

B Specifi Measu (listed in ord r of effectiveness)

1 Piperazine C trate N N D (Antepar®) (syrup or tablets) Each cc of the syrup contain 100 mg p p az ne he a hyd ate th tablets are eq valent to 250 or 500 mg Ad mi ster daily for 7 days follow with a rest per od of 7 days and th n admi ster aga n fo another 7 days Use dosages gi en for As arias p 485

2 Oxytetracycli (Terr mycin®) Oral d op oral suspen i n or capsules G v 10 mg per lb body we ght daily div ded into 3 doses adm niste daily f r 7 days

3 M thylrosa ilin Chlorid U S P Crystal Viol t B P (4 ho r ente i oated t blet) 1 mg per lb body weight d vided into 3 da ly doses a c Give d ily for 8 days foll w w th a rest period of 8 d ys and th n g ve ag in f r 8 days

TAPEWORM INFECTIONS (code No 604 261)
(Pork Beef Fish Dwarf or more rarely Dog or Rat Tapeworms)

Tapeworm inf cti s a cau d by onsumption of contaminat d raw or in ompl tely cooked pork beef f sh water f sl r oth r contaminated food Th acute phase (s ally aft r a lo g i cubatio period of 3 to 4 month) is manifested by di rhe f ver leuko y losis and eosin philia The hro i ph is manif st d by vag e g stroint stinal and C N S ymptom mild t s e anemia and gravid progl ttid in fece or und rclothing Specifi diagnosis of infection w th Taeni s ginata (beef) Taenia solium (po k) and Dipylidium cani um (dog) is made upo ppea an e of gravid p o glottid in feces (occasionally by egg n fe s) Sp if diagno is of infect on with Diphyllobothri m latum (fish) Hyme ol pi n and Hym nolepis dimin ta (rat) is mad pon appe anc f ggs i feces

T eatm t
A Sp if Me u
1 A p d n Oleo es n U S P E tr ct of Male Fe n B P
C trai dic t ons Sev re cardi c hep tic o re al d as co tipat on a ute o ch ic gastroe ter t s febrile st tes pr gna y and infa y
b L w res due f t fr diet f 24 to 48 hou s p o to d ug the apy Alcoh l is o tr indic ted
c M gn um s lfat or odi m ulfate 15 to 30 Gm (1/2 to 1 o) in w ter i gi n the night before treatme t Omit bre kfast on m rning of tr atm nt
d Admin te oleo in of asp d um i gelat n cap ul in thr e qu l d es at half ho r inte v ls ach d e on tai ing f m 0 6 to 1 2 Gm d pend g on w ight of th p tient Childr sh uld eiv 1 m im pe yea f age *The drug should be fresh and not dispensed from bottles which have been opened for some time*
e Magne i m ulf te or od m sulfate 15 to 30 Gm (1/2 to 1 oz) in w ter g ven g n n two hou s following admini t at on of last c p ule No food h ld be pe mitted til the b wel mo e c p ou ly
f Repeat cou s of t atm nt in ot l s than 7 d ys if s ary
g Alt n t m thod of dmi t at of oleo n of asp d i m ℞
A pid m ol o in 4
M cil ge f a ia 30 cc
Co ent ated luti n of s d um sulf te 30 cc
Gi th muls o lly by d od l t be in one d mi st at o Post tr tm t p g ti t n s y On h lf th dosage t f t y fo ch ldre f hool g
h Th p t t sh ld hav h t on b f w m w t r to f il tate p c ment and de tif t n of th he d and proglott d To l t p p ho ld b d s po d of ep t ly E min all stools p s d d l g the ext 24 hour in order to ov the w rm h d f p f f compl t dicat
2 Qu n r ne Hyd hl de U S P M p c Hyd o hlo d B P (Atab n ®)
a On d y p edi g t eatm nt pat nt ts l ght low r id e l n h and s ppe
b Sod m lf t o magn i m s lf t 15 t 30 Gm (1/2 to 1) atha ti the night b fo t tm t On morni g f t atm t om t b e kf t G ve ph o barb t l 30 to 90 mg (1/2 to 1 1/2 g) d pendi g up n the we ght and ag of th p ti nt O ho l t adm n t as single d e 0 5 to 1 0 Gm (7 1/2 to 15 g) (dep d g o weight of pat t) of quinacrine hyd ochlo r d long w th an qual amount of sod m bicarbo at to c ter t au ea and vomiti g
A mo ffectiv remo al of t pewo m than is po ible with o l m d ati i tabl t form m y be accompl hed by dmin st ri g quinac in hyd ochlo id thro gh a duo d l tube

d Sodium sulfate or magnesium sulf te 15 to 30 Gm (1/2 1 oz) in water is given 2 hou s following therapy to id the intestine of the parasite No food should be pe mitted until the bowel move copiously

e *Repeat course of treatment after 7 days if necessary*

3 Hexylresorcinol U S P

a 1 0 Gm (15 gr) in 20 cc water introdu d into the duodenum by a tube Follow in 2 hours with a sodium or magnesium sulfate p rge Examine stools for head of wo m

b Crystoids anthelmintic as administered in ascariasis (s e p 485) is the drug of choic for the treatm nt of light infectio s with Hymenolepis nana (dwarf tapeworm) Fo heavy infections use q inacri e hydrochlo de as for tr atment of Taenia saginata infections

B General Measur Hospitalization s recomm nd d for the treatment of p sons with tapeworm infection S ccessful removal of the paras te can only be a omplish d if ther is cooperation on the part of th patient the clinician and the labo tory personnel Proper pret eatment p paration of th patie t and adequate postpurgation examin tion of stools for the head of the t peworm is necess ry

SYSTEMIC MYCOSES

Mycotic infections e caused by a variety of fungi nd hav wide geog aphic distributio Although their i ciden e is rather *low in ce tain pa ts of the wo ld som of th m oc ur quite com* monly e g co d domy os s n the S Joaquin V lley of Californ a Thei cl n c l manifestation are ex edingly va iabl with some esembla ces to the granulom t s dis ase

COCCIDIOIDOMYCOSIS (code No 012 219)
(Pulmonary code No 360 219)

Coc d oidomycos s or Valley Feve s an inf tio d e to *Coccidioid s immitis which is fo nd in th So thwest United* Stat s Mexico and C nt al a d South Am ica w th spo adic c s in Italy and Hawaii

Diagnos

A Pr mary Form Involves th bron hi nd lung and may manif t tself by fever o gh ythema nodosum and pl risy with effusion X r y of th lungs d r g the p im ry d seas shows p tchy soft inf ltrat on a th s clears s dual nodular shadows may p si t Thin walled caviti s with little s r roundi g infiltrati n m y de lop and r m in fo months The s dimentation rat i levated o gani m may b fo nd in the sputum by cultur and the skin t t may be po tive fter 10 to 14 day Complem nt fi atio and pr pitin te t are helpf l in *diagnosis* and m y aid in d te m ning th p og s of i fectio

B Ch o c or Cra l m to s Fo m 0 2 p r ce t of all p im y cas s progress to the granulomatou tag n olvi g the l ng chest wall or oth r structures The f ding of th o ganisms i inf cted tissu or in the di charg from th le io in this stag makes the d *agnosis* *Prognosis* in thi fo m i poo

Tr tm nt

N specific th r py is known for either form of the disease

A P im ry Fo m Bed re t and symptomati ca e until p ocess h s s bs ded

B Ch o i Form Tre tm t ntir ly sympt matic Pot ss um od d is f no value nd may even be dang ro

ACTINOMYCOSIS (Regional code No 0 202)
NOCARDIOSIS (Pulmonary code No 360 201)

A tinomycosis is world w de in d tributio a d ca s d by n a a obic cti omycete Act omye l a li Noc d s is a s d by iety of a obic type belong g to th g us No rd a (e g N t o des N m d e)

D agnosi

A A t n myco is The p i ipal lesions ar mult pl abs es es s n s and fistul us tr ts which dis harge a a guin pu ule t m te i l co taining sulfur granules A y r g on of the body m y b nfect d but the head and n k a m st f e que tly involv d in wh h c s very l ttle yst mic rea tion oc u The abdominal vis a may be i v lved by w y f th int stin l tract r th lungs pleu a a d chest by w y of the re p rato y t ct In th latter two forms th m y be symp tom f able to the ystem ff ted a comp m d by hills d fev r The fi ding of th typical lf g nul in the lesion i diagno t

B No a d nfe ti m y s mbl class al ct nomy os with the p od t o f cha a te t g nules or prod c a p e dot b culo v l em nt of th lungs d ple a w th x t o at t m to bra n and meming s V riou sp s of No a d c us infecti f the b uta tiss e w th bo e v lv ment (myc tom)

T tm t

A Act nomy Th t tm t of a ti my os m st f e q tly be ont n d fo w ks o m ths

1 P ni llin is the d g of cho An initi l do f 120 000 nit h ld be f ll w d by 80 000 un ts ve y 4 h s Th e of much high dos s is e omm d d by s me clim ians d ily nt am s la inj tions of 600 000 nits fo rvi o fa ial a tin my os s a d to tw million nit p d y f th p lmon y nd abdominal typ

2 S lf di in The on mit nt us of sulf di ine ha b n found b n fi ial n rtain instanc

3 Pota m iod de With som pati nt the above ombin d med tion should be ppl m nt d by iod de th py but t m a t o m t be s d in it ve patient Give t t d s l t on f P ta sium lod d U S P 5 d ops t d in g h d by o e d p t i d until e tions occ a t t l of 20 d ops t i d is r a hed Thu m y be f rth r inc a ed nd as m ch s 100 drop t i d m y b ed if th pat nt n t l rate thu do g If re a ti o c t p dr g and b gin again at a l w do g In s ti pat t it m y be c ss ry to st rt with 1 or

2 drops daily and gradually increase dose

B <u>Nocardiosis</u> Treat as for actinomycosis The disease produc ing aerobic Nocardia are more susceptible to the s lfonamides than is A Israeli Treat with sulfad azine alone or combin with sulfamerazine Mai tain blood levels of 10 to 20 mg per 100 cc until infection is controlled Patient should be main tained on sulfo amide therapy 3 to 4 months following apparent cure

BLASTOMYCOSIS

(Generalized code No 012 200) (Of Skin code No 110 217)

No th American blastomycosis chiefly noted in No th Carolina Illinois and Mississippi is due to Blastomyces dermatitidis The South American variety is due to B brasiliensis and is found main ly in Brazil

<u>Diagnosi</u>

Th North Ameri an variety produces granulomatous ulcerating lesions of the skin and tuberculosis lik lesions of the lungs and at times of other structures The cutane us form usually is without systemic symptoms but the pulmonary form usually has symptoms not unlike those of pulmona y tuberculosis

The So th Ameri an variety involves the muco s m mbran s of the mouth the skin the lymphatic tissue and the visce a

Th diagnosis of either variety depends upon micr scopic recog nition of the haract ristic yeast like fungus in tissues o exudates followed by isolation of the o ganism in ulture

<u>Treatme t</u>

A Potass um iodide th rapy sho ld be given as for act nomycos s (see above) B fo e administr tion of the drug the patient should be tested for s nsitivity to the fungus and to the drug If these cautions are not observed sp ading of th infectious proc ss may occu At the beginning f the treatment only small amounts of potassium iodide hould be us d Further more to preve t dissemination of th infection des sitization or immunization with Bl stomyces va cine may b ne essary

B Stilbamidine has proved to be quite ffective in th treatment of cutaneous and system blastomyco s Dose i 10 to 200 mg daily not exceeding 2 to 3 mg /Kg daily It i given slowly I V n 5% gluco e n w ter o in aline A cou se of 30 days may be eq ired This drug has to b employed w th a tion sinc it is toxic and f eq ently p oduc a neu opathy espe cially of the fifth nerve A related d ug 2 hydroxystilbamidi e has been used su c ssfully on patients infected with B d rma titidis It fortunat ly d es not prod ce peripheral neuropathy

C X ray therapy may be u ed as an adjun t in the utan o s cases The systemic forms are rath r resi tant to t eatm nt a d progr ss in spite of therapy

HISTOPLASMOSIS (code No 010 218)

Histopla mosis i ca sed by Histoplasma cap ulatum a small yea t like organism in tiss e and a mold like fungus in cult re It has a w rld wide distrib tion It primarily involv s th reti ulo dothelial syst m ausing nlargement of the liver spl en and lymph odes and systemic manife tat ns of fev r anemia and *l ukope ia However other sy tems may be involved P tient* f om endemic ar as oft n have pulmonary cal ific tion n gat ve tuberculin t sts and p sitive hi toplasmin skin t ts

N tr tme t is known

CANDIDIASIS (MONILIASIS)
(Pulmonary od No 360-209)
(Thrush of Mouth code No 610 209)

Candidiasis i an infecti n of th mouth vagina kin and nails It may ar ly in olve th lungs and m ing s The diagnosis of th pulmona y fo m may be difficult c ugh and scanty p tum a e m t common finding x y appearan e is imilar to that of tuberculosis but tub l bacilli annot be d monstrated in th putum One mu t d monstrate the constant pr se ce of Candida albicans before the diagnosi can be nt tain d How ve th o gani m *may o cur a n rm l habitant of th th o t so gre t ca e mu t be* tak n in making the d gn is of pulmonary moniliasis

T eat the o al infe t on with lkaline m th wa hes nd t p al ppl catio of gentian iol t diluted 1 10 000 in 10 p r ent alc hol f 4 5 days T eat vaginal infe t n with alkalin do hes do hes f potas um pe ma gan t 1 1500 o g nt an vi let 1 10 000 p opion te vagin l j lly m y b s d F taneous inf ctions soak in olved parts twi e daily in 1 2000 pota sium permangan t fo 30 minut Foll w w th l per ent gentian viol t p int in 15 per t al h l Fo te tinal and anal nf tion ny tatin (Mycostatin®) i an antifu gal s b ta e of val in eliminating o red i g th umber of Candida in th tool It is rec mm nd d a a prophyl ctic o therap t m as f patient o int ns e o p o long d th py with al antibioti who m y d v l p v e Candida infe tion Gi on 500 000 unit tablet th tim daily u til i t t al fungi s ppr ed as d t rmin d by cult of tools D age may be d bl d if e s ry a d th d ug may be given c mitantly with any of the comm n or l ant bi ti s Contin e u f ystatin th o ghout th e tire urs of therapy with the a tiba te ial ag t and f hort p iod aft th administration of the g t has be discontin ed

CRYPTOCOCCOSIS OR TORULOSIS
(Of Skin code No 110 21x) (Meningitis code No 910 21x)

Cryptococco i inv lv hiefly the kin d c tral n rvou sy t m b t may invade the st ctur s It is wo ld wid in di trib ti a d a s d by Cryptococc s of rma s (Torula histolyti) Th c tan s lesions e pustul s granul m tou ulc s o nod l Meninge l involv ment i th sual ce tral nervous

system lesion The disease is usually mistaken for tuberculo s meningitis if the organisms are not found

No specific treatment is available Treat symptomatically

IMMUNIZATION SCHEDULES

Biologicals for immunization purposes are gradually being modified and concentrated The sched les below do not apply to all preparations *follow the manufacturer s instructions which accompany the preparation*

Child en

1 Du ing first y ar
   a Uncombined method P rtussis vacci three subc t injections of 0 5 cc each at one mo th inter als begin ning at 2 to 3 months of age d phtheria tetanus toxoid (alum or aluminum hydrox de) subcut injectio s of 0 5 1 0 a d then 1 0 cc at one month intervals beginning at 6 months of age and smallpox vaccinati n at 6 mo ths t 1 year of age Repeat if a take does not occur
   or b Combined method Diphth ria pertussi tetan s (com bined) three subcut injections of 0 5 cc e h at one month i te vals starting at 2 to 6 months of age and smallpox vaccination as w th ncombined m thod
2 At two years Schick test and booster d se of diphtheria pertussis t tanus mixture 0 5 cc by subcut injection
3 At school age Repeat procedure as for two yea s and do vaccinatio (rep at if a 'tak does not occu)
4 Smallpox vaccination eve y 5 7 years or on exposu e

Adults

Adult traveling to foreign countries should obtain a list of required immunizations when applying for passpo ts Those living in end mic a eas should maintain the r immunizat on

1 Smallpox va cination Repeat every 5 year o on expos re
2 Typhoid (o typhoid p ratypho d) vaccine (1 billion organisms p r cc) 0 5 1 0 and then 1 0 c by subc t injection at w ekly intervals *Repeat seri s every 3 yea s*
3 Yellow fever v ne (Africa S uth Americ) 0 5 c sub ut
4 Typhus vacc ne (Cox type) (Europe Asia Af ca Australi South Ameri a a d Mexico) 1 0 cc s bcut rep ated 7 to 10 d ys later for total of 2 do es Rep at 1 0 c every 4 to 6 months
5 Ch lera vac in (Asia N ar East East Indies) 0 5 and then 1 0 cc ev ry 4 to 6 months
6 Plague vaccin (2 billion o g nisms/c) (Egypt A ia Ea t Indies) 0 5 and 1 0 c s bcut at interval of 7 to 10 days
7 Tetanus toxoid 1 0 c s bcut rep ated at 30 and 60 day f r total of 3 do es Boo ter nj ction of 1 0 c 1 year later and on inju y
8 Diphtheria immuniz tion in adult who are S hi k positive is freq ently follow d by seve e local and g neral eactions *A Moloney* test (0 1 cc of 1 20 d lutio of fl id to id) should be appli d int aderm lly *If negative* 0 5 1 0 and

then 1 0 c s bcut may be given at monthly intervals If pos tive inj ct intradermally 0 1 c of 1 10 dil tion of t o d at 3 to 4 week int rv ls for 3 d ses

HYPERSENSITIVITY TESTS AND DESENSITIZATION

B for inj cting antitoxin o simila mate ial d r v d f m an mal ource always perf m the following test for hyp sensi ti ity If both te ts a e neg tive no dese itization i n essary and a full dos of the antitoxin m y b giv n If one o both of the t st a e pos ti e des nsit t n is n e s ry

A Intr de m l Test Inject 0 1 c of a 1 10 dil tion of the anti t in int ade m lly into the skin of the fl xor s face of the fo ea m A pos t ve t t s manif t d within 30 min tes by th oc nc of a larg wh al and su ounding areol

B Conjun tival Te t I still 1 dr p of a 1 10 dil tion of th anti t x n into th conjunctival sa of one ye a a t st dos and 1 dr p of phys ol g al saline in th oth ey as a control A pos tive t t is indi at d by conjun tival inj ct n t hing and edema o r ing w thin 30 mi tes

D s siti t o

A Pr tionary Measure

1 Ant hi tami d g should be administered before begin ni g d en itizatio in order to les n any t on that might oc ur (se p 45)

2 Epinephrin U S P Ad nalin B P 0 5 t 1 0 c (8 15♏) of a 1 1000 l tion must be dy in a syring for imm diat dministration

B D s s t ation Meth d Th foll wing plan m y be u d in d en it t on G v dos s I M t 30 minut nt rval nd ob rve clo ely for ea t o s

1st d e	0 1 c	(1 10 dilutio)	7th do	1 0 c (undil ted)	
2 d d s	0 2 c	(1 10 dil tio)	8th and ub q ent dos		
3rd do e	0 5	(1 10 dil t)	1 0	(dil t d) eve y	
4th d e	0 1 cc	(und l t d)	30 minut until th t tal		
5th d se	0 2 cc	(dil t d)	mount of ntitoxin is g v n		
6th d se	0 5	(undil t d)			

Tre tm t of R ti

A If m ld ti n oc d op ba k t th next low do and cont e with th d e iti at o If s v e r a tion oc r adm ni te pin ph ine a m ntioned below d dis ntin e th a titoxin unl s this t eatm nt u g ntly n d d Should d s ns t t be imp tiv o ti slowly using m gradual i of th t t xin

B If m nif station of a re action appea giv 0 5 to 1 0 c (8 15♏) f pinephr s bc t at o The ymptoms in l d ti a ia gio oti ed ma dyspnea coughing hoki g o shock M int in l s ob rv t n of the patient a d pe t pin ph in a es a y

Chapter 20

ANTI INFECTIVE CHEMOTHERAPFUTIC AGENTS

Sulfonamides antibiotics aminosalicylic acid and isoniazid are used for the treatme t of bacterial and rickettsial infections for the treatment or prevention of secondary bacterial infections in virus diseases and for prophylaxis against streptococcal infections in patients with valvular heart disease (to pre ent subacut *bacterial endocarditis*)

Precautions in the Us of Chemotherapeutic Agents

1. *Etiologic diagnosis is of paramount importance*
2. Indiscriminate use may lead to s rious toxic reactions
3. Insufficient do ag or unnecessary administration for minor illnesses may permit the emergence of resistant strains
4. Certain combinatio s may antagonize each other Combined administration is probably b st avoided except in e ception l *cl n cal circumstances where th ind cations are clear*
5. Topical administration (especially penicillin and s lfonamid) may sensitize the patient so that a severe hype sensitivity reaction may o cur upon later systemic use

CHOICE OF ANTIBIOTICS IN BACTERIAL INFECTIONS

The choice of antimi obial agents in the treatment of bacterial infections may be made in o of three ways

(1) The clinic l appearance may be so characterist c of a given etiologic ag nt that pecif antimicrob al the apy an be chos n without bacteriological exam nations (E g me i go oc al men gitis ac te gonorrh a pn mococcal loba pneumoni)

(2) The clinical appearance may b compatibl with a variety of etiolog c o ganisms in which case it s necessary to d ntify the specific o ganism by sm ar c ltu et Wh the o ganism has been id ntified the antim crobial d ug of hoice can usually be s le ted on the basis of clini al e peri nce (E g peni lli fo streptococcal infections chloramph nicol fo alm ella enteritis s lfo *amides f meningococc mia*)

(3) If the drug of choic for an id ntifi d organism is not k ow (due to the variability of spons to antibi tics o the part of some organisms g staphylo occi colif m ba illi) o if the organ ism itself s not known but c n b isolated from linic l specime antibiotic e sitivity test (see below) a e req ired to det rmin *which* of several available a timi rob al ag nts is likely to hav a bacterio tatic or bacteri idal effect

Antibiotic Sensitivity Te ting

The principles of ant b otic sensiti ty testing ar outlined below However th imm diate clinical itu tio must be born

m m nd m d cid g whether to w it for the res lts b fore pro eed ing w th antimic obial th r py In most insta ces empiri l th rapy bas d o a ea d a sumptio of the ti logic ag t may be b gun without ns tivity test In s vere infe t ons tre tme t sh uld be begun nd l t r lt ed f und at d by s itivity t ts T ts hould be pe f rm d in bact ial e doc rd tis ecu re t infectio s (p ially of the urinary tra t) a d infect ons due to o g nisms lik ly to exhib t c s derable st ain va iatio in s nsitivity

A Pl te T ts I c late a c ltur plate h avily w th the clin cal p cime (e g ur e pus thro t sw b) o w th a pu cultur and wa t f w m nut s u til the plate i d y Plac small f lter p p d sc satu at d with vari us a tib ot s on th plat 2 3 cm pa t In ub te o rn ght Drugs wh ch fail to give on of inhibit on re ot likely to be lini ally sef l again t th t st orga ism NOTE This is a crude rap d te t wh h d es not lw ys cor elate well with the esults f t be s sit vity t st or w th cl c l r po e

B T b T st Th t t m asures mo exactly the concent at on f a a tib t c ess ry to inhib t growth of a st da diz d o ul m und r d fin d ond tio A s i of broth t bes con t i ng grad t d amounts of an antib tic is i o ulat d with a dil tio f f sh broth cultur of th test o g m m Aft r in cub tio th tub s a e xami d f t bid ty The e d point s o sid d t b that co c nt t on of ant biotic t ined in the last t b remaim g lea Upo th b si a r gh estim t of th i vi d e c a y to inh bit growth of the t t gan m can b r i ed at In dd tio ba t ic d l ff t m y b d termin d by th t b d l t on m thod

SULFONAMIDE DRUGS

Th sulf namid d gs a e bstit t d d r vativ s f sulfanila mid N w r de vat ves h ve w d antibacterial spe t a and mo d r ble pha ma log l p ope t than th old sulfona m d Sinc th a tivity of ny ulf namid compo nd may b pre d ct d on the b s s of c rtain physi ochem l p in ipl s it is evid t that maxim l ant bact i l ffe tivenes ha be n approxi m ted by s lfadia in sulf mera in s lf metha in a d sulf soxa l (Ga tri in®) a d the of old r sulfonam des is ra ly if e wa nt d Sulfam thoxypyr daz ne (Kyne ®) a slowly ex et d d g off s p om s as an ff tiv ag t

I di ti d Ant m bial Sp trum (s t ble n p 514)

Th ulf m d d gs h v a w de b t till limited range of a t vity gainst path genic g nt At th prese t time the sulf na mid s a th th ap utic ag ts of choi only in m ningococcal inf tio (N is ia me ingitidi)

A E c pt f the inf tion mentio d bov th sulfonamides sho ld be us d a alt rnate o ddit n l gents to o e of th ant b t gai st inf t ons of k own ceptibility

B Gluc ulfone sodi m (P min®) thia os lf (Promi ole®) and lf o sodi m (Diaso ®) are m mbe f th ulf mid g o p whi h how p omise within a l mit d ar r u ually d n add t t the g ts again t the f llowing path g s

1 Myc b teri m tube ul is
2 Mycobact um lepr

ANTI INFECTIVE CHEMOTHERAPEUTIC AGENTS

[illegible] [illegible] [illegible] aminosalicylic acid, and isoniazid are used for the treatment of bacterial and rickettsial infections for the treatment or prevention of secondary bacterial infections in [illegible] diseases and for prop[illegible]axis against streptococcal infections in patients [illegible] valvular heart disease (to prevent subacute bacterial endocarditis).

[illegible] in the Use of Chemotherapeutic Agents

1. [illegible] diagnosis is [illegible] of paramount importance.
2. [illegible] use may lead to serious toxic reactions.
3. [illegible] dosage or unnecessary administration for minor illnesses may permit the emergence of resistant strains.
4. Certain combinations may antagonize each other. Combined administration is probably best avoided except in exceptional clinical circumstances where the indications are clear.
5. [illegible] administration (especially penicillin and sulfonamides) may sensitize the patient so that a severe hypersensitivity reaction may occur upon later systemic use.

CHOICE OF ANTIBIOTICS IN BACTERIAL INFECTIONS

The choice of antimicrobial agents in the treatment of bacterial infections may be made in one of three ways:

(1) The clinical appearance may be so characteristic of a given [illegible] that specific antimicrobial therapy can be chosen without bacteriologic examinations. (E.g., meningococcal meningitis, [illegible] pneumococcal lobar pneumonia.)

(2) The clinical appearance may be compatible with a variety of [illegible] organisms, in which case it is necessary to identify the [illegible] organism by [illegible] culture, etc. When the organism has been identified the antimicrobial drug of choice can usually be selected on the basis of clinical experience. (E.g., penicillin for streptococcal infections, chloramphenicol for salmonella enteritis, sulfonamides for meningococcemia.)

(3) If the drug of choice for an identified organism is not known (due to the variability of response to antibiotics on the part of some organisms, e.g., staphylococci, coliform bacilli), or if the organism itself is not known but can be isolated from clinical specimens, antibiotic sensitivity tests (see below) are required to determine which of several available antimicrobial agents is likely to have a bacteriostatic or bactericidal effect.

Antibiotic Sensitivity Testing

The principles [illegible] [illegible] testing are outlined below. However, the immediate [illegible] situation must be borne

C P ti s

1 H moglobin determinati n and white blood ell ount ev ry othe day Differential if WBC is l ss than 6000 Di o tinu ulfonamid If gra locyt count is les than 50%
2 Daily f esh urine fo pH (use nit a ine pap r) a d s dime t Inc ase alkali (sod um bi arb nat) if pH is l ss than 7 0 Discontinue d ug if red blood ells ar fo nd i urin (s e above) In rease urine o tput if le s than 1500 cc per day o cry t ll ia oc urs (must be examined for in a f esh specim)
3 Daily observ tion of patient fo drug fev r sh j und c nau a vom ting tc

Co t ind tion to S lfon m d

1 History of p evio s s ve rea tio
2 Renal insuff c ency (V ry mall dos s may be us d with ut on)
3 Liver damag (Proc d with c tion if ssential)
4 H art f il re (If sulfonamid s are ab ol t ly nec ssa y b titut pota si m b rbonate fo odium bica bo te a alkalinizing g nt)

AMINOSALICYLIC ACID (PAS)

Aminosalicycli a id (PAS) and it s di m salt h be n found to exe t co id abl tub rculostatic ct vity T ber le b cilli r ista t to trept my in may b su eptible to PAS and vic ve a The simulta eou admini trat on of PAS and strept my in d lay the em gen e of strains f t bercle ba illi resistant to the latt In addit to th bact riost tic eff t antipy eti a tivity is p s nt

PAS i ab o bed e dily f om th gast ointest nal t act P k serum onc ntration a r h d in 30 to 60 min t and minim m lev ls a e again rea h d in 4 ho s PAS m y b administ d in t veno sly and subcut eo sly

D s g d Rout of Admini t tion

A O l 3 to 4 Gm (45 60 g) as th cid ev y 6 hours
B I trav n 15 Gm in 3% s lution gi e in 2 doses 4 ho rs ap t 5 mg of h p rin h ld be added to ach l t r

T xi ity

Na sea vomiti g d rrh drug feve dermatitis ry t l l ia hemat i and hyp p othrombi mi m y be obs rved Ga t oint stinal ymptom m y ppa tly be avo d d by pa nt ral admini tratio of sodium PAS

ISONIAZID (INH)

I niaz d (INH) and lated compound po es considerable t ber l tatic a tivity Cr s istanc to treptomy in and PAS does not xi t Ba terial esist to INH d v lop rap dly INH is eadily bs bed f om the ga trointe tinal t act and dis trib ted th gh ut the body fluid in l ding the r b o pinal fl id

Oral Sulfonamides Adult and Pediatric Dosage Schedules

I di tions d Prep r tions	Adult Dos ge	Pediatri Dos g
Most inf tions		
Initi l dose One of sulfonamide or lfon mid mixt	2 4 Gm (30 60)	25 mg (1/3 gr) /lb body
in an e S lf di in d e lf me azin d m thod)	0 5 Gm (7 1/2 gr) q 6 H	5 mg (1/12 gr) /lb q 4 H
or l (Gant l in)	1 Gm (15 g) q 6 H	mg gr) /lb q 4 6 H
or am in lf di in d lf thi	Gm g) q 4 6 H	mg gr) /lb q 4 H
S lf di in	1 Gm (15 g) q 4 6 H	10 mg (1/6 gr) /lb q 4 6 H
r S lf m in	1 Gm (15 g) q 6 8 H	10 mg (1/6 gr) /lb q 6 8 H
r S lf m th ypy id i (Ky x®)	1 Gm (15 g) d ily	10 mg (1/6 gr) /lb daily
U y t t f u On f sulfonamid lfon mide mixt	0 5 1 Gm (7 1/2 15 gr) q 4 6 H	5 10 mg (1/12 1/6 g)/lb q 4 6 H
P ophyl i f pt l inf tion On f lfonamid r lfon mid mi t	0 5 Gm (7 1/2 g) b i d	5 mg (12 gr) /lb b i d
I t tin l inf tio S lfagu nidin o ccinyls lf thi) (S lf idin ®)	50 mg (3/4 gr)/lb St t th 25 mg (3/8 gr)/lb q 4 H	
Lep y d t be l is Gl lfon odi m (P min®)	4 (1 d) Gi daily I V f 3 wk p t e ft	0 5 3 (1/2 3/4 d t 1 wk d d
Thi lf (P mt al ®)	1 6 Gm (15 90 g) d ily in di d	0 25 1 Gm (4 15 gr) q 6 H
Or lly pt d (gl os lf)		

Toxi ity and Ma ag ment

A T R tions

1 Mild Continue th r py f nec ss ry Symptoms incl de nausea vom ting h ada he di zine s rystalluria

Mode ate Stop therapy unl s ontinuation is essential to *life Symptoms in l d f ver ash stomatitis conjun tivitis rth itis diarrhea* microhemat ria psychosi

3 Sev re Stop therapy and p sh fluids Symptoms incl de granulocytopeni hemolyti anemia plastic anemia thrombocytop nia h p titis exfoliativ d matitis sev re h maturia oliguria leuk moid r ctio

B Allergic R ction A con id rable percentag of individuals who have pr vio sly *received ulfonamides* p ially fo more than 7 days become sens ti ed nd m y dev lop immediate and eve e re tion on administratio F ver angion urotic dema urticari l a d oth r rash nd p arteritis nodosa *may occur*

History of previous administration should be obtained Cross sensitivity to various sulfonamid may xi t S v symptoms may be voided by giving a t t do of 0 5 *Gm* (7 1/2 gr) and *observing for 6 hours*

t oyed Acq i ed p n illin res sta e is n t omm ly countered
cl ı lly

Abs ption D st ib tion, E ret on

A Abso pt on P n ill n ın w te y ol tion s pidly abso bed wh n dmini ter d intrav nou ly o ıntramuscularly a d some what more slowly ab rbed aft r subcuta ous inj ctio Th p k con ntration in the blood s ched imm d ately after int aveno s inject on and w thin one ho r aft intram scula nject n Bl od lev l pe st f f om 2 to 3 h urs after do es of l ss tha 50 000 units i tramus ularly a d som what long r w th larg r dos Pe c lli procain susp n io s p od meas abl rum oncent t ns fo 12 to 48 ho rs and fo 96 h u s when mb n d with 2% aluminum monost rate Be za th c l penicillin may p od ce me surabl um o cent tion f on mo th ft r inj ction of 600 000 to 1 200 000 un t W th ll pos to y fo m maximum er m onc ntr t on tend t b lowe than with aqueous l tio d so a e not pp o pri te wh re high se um onc t ation s des able Pe icillin whil not ab orb d f om th tom h is ab o bed readily f m th sm ll int st App oxim t ly 5 t m s the int m s l dos must b given to prod compa bl blood lev l Antacids and buff s t d to d rea the d tru t ve ffect f gast ic juic a d b orpt on is b t wh n th stom ch i empty P n ill n V not de troy d by g tr acid P i illin is p o ly abs bed f m the tum and ın nstantly b orb d from th agi a The con entr t on of pen llin se m and oth r body fl ids m y b measu ed by va s b o as ay m thods

B D t ib t on Pe i ill n is di t ibuted thro gho t th body fl id but p n t tes the j ints ple ra pe iton um and s b achnoid spa es i gularly P netration mo l k ly to cur if i flamm ti n xist P n cillin pe ist in the t s es f r a o s d abl tim aft it ha dis ppe ed from the bl d henc nt s bl od l vels a e n t n ess y most inf tion Organism xpos d t pen ill do not mult ply for o id r bl t me afte xp au

C E to Pe i illin i t d p i c p lly th u ıne 80% of inary e t is t bula and m y b p tly bl ked by ch ge t as ar m d p a ami hipp ic a id iod py cet (D od st®) and p b d (Be m d®)

P parat s

A C mm lly Ava l bl P p rati Incl de

1 C yst lli penic llin (od um pota m salts)
2 P ni illin p oc in i oil
3 P nicilli p oc i i oil w th 2% l mi m m ost arat
4 P ni illin p o ain in aq ou p si (may be om bi d with ryst lli p ni illin odium)
5 P icilli tabl ts with o with t b ff d bi d g (50 000 to 200 000 unit p tabl t) and b th l peni cilli pe i n (60 000 units p) f o al u
6 P icillin V t bl ts 125 mg f o al u e
7 P icill p wd for i sufflatio (50 000 unit p a tridg)
8 Pe icilli i ol tm nt in v i s b s (gen al d phth lmi) (500 2000 nit pe gr m)

Dosage and Ro tes of Adml istr tion

I oniazid 5 to 10 mg (1/12 1/6 gr)/Kg body weight per d y in 2 or 3 doses orally Ten mg (1/6 gr)/Kg should be gi en daily in t b rculous meningitis Sterile solutions may b given I M

Toxicity

Co stipation dysuria hyperreflexia postural hypote sion and dizziness eosinophilia slight anemia occasio al casts and tr ces of albumin in the urine reducing substances in the u ine

PENICILLIN

Penicillin is prepared from the cultural prod cts of the molds Penicillium notatum and Penicillium chrysogenum The commer cially available prepa ations are crystalline sodium calcium potassium and p ocaine salts of pen cilloic acid

Many types of penicillin F G O V X and K are produ ed by the mold Commercial penicillin is princip lly penicillin G Pe icillin X which occurs only in small amounts xh bits a slightly different range of ant ba terial act vity Peni illin K becomes bound to serum p otein and is relat ely ina tiv therapeutic lly

The Oxford and Inte national units of penicillin are measu ed in comparison to the bacterial inhibit ry power of a standard p ni cillin Crystallin sodium penic llin ontains approximately 1500 nits per milligram Dried crystalline penicillin r t ins its pot n y indef nitely but w t ry solutions m y d teri rate e pecially wh n not ref igerated

I di at ons and A tim c obial Sp ct um (Se t bl j 514)

Pe c llin exerts bacte iostat c and bacteri dal a tivity against a wid variety of pathog nic agents b t the sus eptibil ty of thes ag nts to penicillin may vary ons de ably Clinical r spo se of inf ctio s may be p ed ct d with fai a uracy by mea s of in vit o sensitivity tests of th nfecting o gani m Thi pro d should be perf rmed wh n xpected therap t c re pons do s not o ur or in the case of infe tions du to organisms s h a staphyloco ci or St eptococcus fec lis many str ns of which ar nat rally r s stant to penic lli

Peni illi is indi ted when nf ct o with a o g ism known to be generally sus ept bl s diagno d o p esum d He ce o e t eats a spe if c infection not a disease e g p e mococcal pneumonia not pn umoni str ptococe l pharyngit not a ut pharyn gitis For specif c nd cations s e und r di eas in q stio

Mod of Acti n, R sist c

P nicillin is both bacteriostat and bacter c dal Its xa t mod of action is not know but i s me way it ppa ently inter fer s with th repr d tiv process of o ganism

Certain o ganism produce peni llinase whi h inh b ts peni cillin s tivity This m y occur t r lly as i the as of E coli and some strains of t phylococ i S ceptible o g i ms existi g in s blethal oncent at ns of pen c ll n m y a q ir r st nce Tho e mutants of the or g l organ m whi h we e n t rally r s s tant survive a d mult ply whil th s cept ble o ga i m re de

penicillin di olved in 10 cc of physiologi l salin sho ld be administ ed o e a day until the cereb ospinal fluid gl ose cont t b c mes normal Peni illin should also be giv n intramuscularly

3 Int pl ral intra artı ula 10 000 to 200 000 unit of p ni illin may be introd ed into joint o pl ral paces in fect d by usc ptibl organism daily o every other d y f llowing aspiration

4 Oral Troch of p nicillin may be dissolv d slowly in the mo th in the t atme t of Vinc nt s stomatitis and pharyn gitis This form of therapy is valu l s in oth forms f pharyngitis and may p od c tomatitis

5 Wounds and skin Solut ons of p nicillin c ntaining 200 1000 units per cc m y be ed a a w t dre ing in infect d wounds Peni illin is of no val e as n i igating solution because of the neces ity of prol nged conta t to prod ce a tiba terial eff t

Ointments f p ni illin incorporat d in var us b se may be a d on inf ctions of th skin d e to s ept ble o gan isms

T xicity

Sin e th p ific t n of pe illin tr toxi r tions are lmost unknown S nsiti tion may be pr exi ting o i d c d F ve and sh esp tally u ti ar al may appea d ing th ou se of peni illin dministration o as long as a ve l w ks late Thi m y exa tly mimic e um s ckness Tru idiosync a y to p ni illi is rar d m y be la gely limited to i dividual s ffer i g f m de m t phyto es Po it v intr d mal test to weak pen llin lutions may be bse ed D en iti atio m y b ttempt d P t ts k ow to be s ns ti e t pe ic llin m y be treat d w th peni cillin O or ph ami e p nic llin G wh ch m y b sub tituted fo qu us d p o aine peni illi e pect vely in the s m dos s C ss e itivity o urs oc a io lly and should be gua d d ag i t

STREPTOMYCIN

St ept my is p pa d from the ult l p od cts of St epto myc gris s Commer ially available Its incl d the ulf te hyd o hlo de and the al ium hl de compl x Dihydro tr pto my in m y b us d alternat v ly with t eptomyc Vest bular d m ge i l s f eq ent foll wing dihyd ost ept my in the apy b t d af es o ur m e oft n following prolong d d hydrostr ptomy in th py than tr ptomy n t tme t One mic g am (γ) equals 1 W k m n unit d 1 Gm equals 1 000 000 Waksman unit

I dicatio a d A timic obial Sp tr m (S table p 514)

St ept my s p c p lly a ti g t g am eg tiv o gan i ms but po a signif t activity gai t om t in of gram po it e o i P ni illin nd t pt my in ex t m k d yn gi tic ctivity in infe tio d to St ptoc cc f li d tr pt my in d hlo tet ycline t sy ergi t activity in b ello i

The indi atio s f st eptomy i lmo t nti ely limited to inf ctio d to g m gativ o gani m a d tub r ulosis F thi r s xa t ti l gi al di gnosi ho ld be so ght befor t

B Strength of Solutions and Suspensions
1 Crystalline penicillin is generally given in a concentration of 10 000 units per cc but may be much more concentrated
2 Penicillin for subarachnoid injection should not be more concentrated than 1000 units per cc
3 Penicillin procaine complex in aqueous suspension may be prepared in concentration of 300 000 1 200 000 units per cc

Dosage and Methods of Administration
A Intermittent Intramuscular, Penicillin in aqueous solution may be given in doses of 5000 to several million units every 3 hours intramuscularly This remains the method of choice in most severe acute infections In many infections equally good results may be obtained by administration of 100 000 to 300 000 units every 12 hours intramuscularly Intramuscular injection of 300 000 to 600 000 units of penicillin procaine may be given every 24 hours Penicillin procaine in oil with 2% aluminum monostearate produces measurable blood levels which may persist as long as 96 hours Benzathacil penicillin 600 000 to 1 200 000 units produces measurable serum concentrations for one month and is ideally suited to prophylactic use These preparations are highly satisfactory except in the most severe acute infections
B Continuous Intramuscular and Continuous Intravenous, Where very high doses of penicillin are necessary in the treatment of infections due to resistant organisms administration by continuous drip is often advantageous Many million units dissolved in 1000 to 2000 cc of physiological saline or 5% glucose solutions may be given by indwelling needle or catheter in 24 hours The intramuscular site should be changed as frequently as irritation occurs Thrombophlebitis as a complication of intravenous administration may be avoided by hanging the vein use d o by addition of 10 mg heparin sodium to the solution
C Oral, Penicillin may be given orally in all but the severest of infections or oral medication may be substituted for parenteral after initial response to treatment Doses of 100 000 units every 3 hours to 300 000 units every 6 to 8 hours may be gi Penicillin V may be given in a dose of 125 to 250 mg every 8 hours
D Topical
1 Aerosol 50 000 to 100 000 units may be aerosolized from 3 to 8 times a day A solution containing 50 000 units per 0 5 cc may be nebulized by means of Vaponephrin® or De Vilbiss No 40® nebulizers Forced deep inhalation followed by retention of the inspired penicillin as long as possible should be insured Hand pumping or compressed gas fed through a Y tube may be used to nebulize the solution While local effect in the respiratory passages for the treatment of bronchiectasis chronic bronchitis etc is usually the objective appreciable blood concentrations of penicillin frequently result Sensitization occurs commonly
2 Intrathecal Although penicillin may penetrate the subarachnoid space after intramuscular injection this phenomenon is inconstant and may be delayed Therefore in meningitis due to susceptible organisms 10 000 units of

Toxi ty

Painful loc l re ctio ar uncommon at p es nt Drug rash s f many sort occur drug fev r may be ob erved and slight nau e and d z ness are frequ nt Eos nophilia m y be not d but appears t have no ignif can Cylindrur a and nitrog n r tention not as sociat d with perman nt nal dam ge have b n r ported Ves tibula damage oft n manif sted fir t by tinnitus and haracteri ed by severe vertigo and ataxia follows high or prol ged dos ge If streptomy in is dis ontinued immediately r cov ry u ually follows If v stibul r dam g b omes p manent s t sf ctory compensation is ually made by the pati nt Deafne s also may ccur but it ra V t bular ppar tus d pr ssion is less common with d hydro t ptomycin but d afn ss may dev lop after treatme t has been topped The se f c mbined streptomycin and dihyd o streptomyci in equal parts ed es the incid n e of d afnes and v stibular dam g Pleo yto s in r se in p otein cont nt of the spi l fluid s bar chn id block or myelitis may follow p olo ged intrath al dministr t on of st pt myc n

TETRACYCLINE GROUP (CHLORTETRACYCLINE OXYTETRACYCLINE TETRACYCLINE)

The h m c lly lat d d gs p s e s simila antimicrobial spe t a and pha m logi al propertie O gani ms e istant to one drug a s ally r si tant to th oth s although significa t v iatio oc asionally occ G n r lly they are lini ally inter h ge bl

CHLORTETRACYCLINE (AUREOMYCIN®)

Chlo t t a ycli (A omycin®) is prep d f om St epto myce ofaci s It s av ilabl as th hydrochlorid

I di t on and A timi r bi l Spe t um (See t ble p 514)

Chl tet y lin (A omy in®) s an alt rnat e to pe icillin o at pt my in i mo t bact rial inf cti ns It is a b ad spe t m ntib t w th a wide th rape tic ra ge It i activ gainst mo t gram negative ds d gram po it ve cci the sp chet of l pto p osi r lapsing f ver rat bite f er syphilis a d y ws a well a the rickett iae of typhus Rocky M unt in sp tted f ver ub typh Q f ver a d rickettsialpox It is highly a ti e gain t the iruse of p ittaco is lymphop thia v ne eum d p mary typic l pneum nia

Ab rption E etion

Chl t tra y l is bs rbed slowly from th gastroint stinal tra t and peak blood con ntrati s are re h d in f om 2 to 4 hou s d pe si t lo g as 12 to 24 ho rs d pending on the do e I tra en administration p od e an imm d ate high blood con ntration whi h drops ove a period of 6 to 24 hours varying with the d Chlort tra y line is poo ly absorbed aft r mu cula in je tio unl s hyal onida e is add d Accum lation occ rs in the

stituting treatment Most tube cle bacilli become streptomyc resistant within 3 months of the beginning of treatme t altho gh th simultaneous use of PAS or isoniazid may delay this event a d one or both should always be used with streptomycin in tuberculosis

Mode of Action R ista ce

Streptomycin is both bacteriostatic and bactericidal Its mode of action is unknown Resistant variants of organ sms may multiply quickly in infections treated with streptomycin so that further therapy with the antibiotic is useless Streptomycin should be sed only wh n necessary and adequate initial dosage should be used to prevent development of drug resistance

Absorpt o Distribut on Excr tio

A Absorption Str ptomycin is readily abso bed from the s t of ntr muscular injection The peak serum on entration is reached within one hour and dete table amounts are present up to 6 hours later It is likely that streptomycin persists longe than this in the t ss es If st ptomycin is administered ev ry 3 to 4 hours gradually increasing serum l v ls will be noted due to slow accum lation Administration ev y 6 hou s is suff cient in all but the most te infections in which ases the dr g sho ld be given initially every 3 o 4 hours St epto mycin is not ab b d from the gastrointestinal tract but exerts bacteriostatic activity in the lumen of the bowel

B D stribution *Streptomycin is distributed throughout the body* similarly to p ni illin Pen t at o of the c r brospinal fluid is inconstant and unreliable

C Ex tion Streptomycin is exc eted principally in the u in whe e th concent atio exc d that i the serum

Dosage a d Rout s of Administ at n

A No t be lo I f cti 1 to 5 Gm daily may be give in t amuscula ly *di ided doses every 3 to 6 hou s* Most acut ge e al zed i f t o eq pp oximately 2 to 4 Gm per day Uri ary t act infections due to highly u ptible org n isms may be t ted with 500 mg i tram larly e ery 6 hours for 5 day St eptomycin sho ld ot b s d in the pres ence of obstru ti n of the u i a y t t because of the ne r c rtai ty of th d v lopment of sistant organisms

B Me ingitis I dd t on t int am scular admi istration 25 to 50 mg d ssolved n 10 cc of physiological line sol tion may be give intrath cally once daily until th r b pinal fl id suga co tent b come rmal

C Bacillary Dy te y Streptomyci m y be given orally 0 5 Gm (7½ gr) e e y 6 ho f hig lla dys te y

D Tub rculosis. 0 5 Gm of str ptomy in and 0 5 Gm of di hyd ostreptomyc n int amuscula ly twi e weekly is indicated in non disseminated forms of t b culosis In a te cases of t berculous p eumonia and mili ry tuberculosis 40 mg /Kg of body wt *(20 mg /lb)* d ily sho ld be giv n In t berculo m ningitis 60 mg /Kg of body wt (30 mg /lb) d ily sho ld be administered i t m scularly i additio t 2 mg /Kg f body wt (1 mg /lb) p r d y intr thecally unl s i niazid i used simultaneously (See Tube cul Meningitis p 468)

C Intr m s lar Th prep rati n fo I M use may be given in a dos of 0 5 mg ev ry 24 hours or 0 1 Gm every 6 h urs

T xi ity
Naus v miting d ar hea stomat tis a d d rm titis oc ur occasion lly Hep titis may result from pr l ng d int v s tr tme t at h gh dos ge Thrombophlebit m y res lt f om intra enous administration Sup rinf ction with esistant taphylococci may oc ur us ally a seve ent r colitis Th also oc urs with other b oad spe t um antibi tics

TETRACYCLINE (ACHROMYCIN® TETRACYN® POLYCYCLINE® STECLIN® PANMYCIN®)

T tra ycli is p oduced by emoving th chlo i fr m chlor t tra y lin It s simil to hlo tetr ycl and oxytetr ycline b t i mo e st ble n sol tio than ther derivativ

I di t o and A t mic bial Sp t um (S e t bl on p 514)
T tra y l i a b oad pe t um tib ot who e f ld of a tiv ty i n l r to those of chl tet y lin and oxyt t acyclin S eptibility of st ins of ba teria m y diffe among th th e d gs how ver

Abso ption and E etion
Tetra ycln bso b d a d ex reted simila ly to hlort tra ycli It may diff m re ad ly into th cer b pinal fl d Pho phat b ff g inc s e m ce t atio

D s g and Ro t f Adminst ati
A O l, 0 25 to 1 0 Gm ev y 6 ho
B I trav n s, 0 5 to 1 0 Gm every 12 ho
C Int amu l , 0 1 Gm ev ry 8 12 ho

T xicity
S mila to th t of hl tetracy lin d oxyt tr cy lin but signif ca tly l s f q ent

CHLORAMPHENICOL (CHLOROMYCETIN®)

Chlo mph ni l (Chlo my tin®) originally prepa d f m St ept my es ve u lae al p od d syntheti ally

I di ti n a d Antimi robi l Sp t m (Se t bl on p 514)
Chl amph nicol i t v ga t wid ra g of bact a th ri k ttsiae nd the vi us s of lymph pathia ven eum ps tta o i d p lm ry typical pn um ni Ge erally sp aking it is mo effe tiv th n hlortet y line and oxyt t a y lin in typhoid fev ppr ximat ly qual in effe t gainst oth r gram n gative rgan isms spi h t e a d rick ttsi Many t phyl oc i m in ceptible t hlor mphe ol

Ab orpt on and E t on
Chlo mph ni ol pidly bs bed fr m the gast oint tinal

body at high dosage so that blood levels become increasingly elevat ed during prolonged administration at high dosage Chlort tracy cline is excreted slowly by the kidney It does not appea re dily in the cerebrospinal fluid or ple ral fluid but it is present in high concentration in the urine and stools

Dosage

A Or l 0 25 to 1 0 Gm may be given orally ery 6 hours

B I travenn s S milar results may be obta ned by the intr venous administration of 100 mg every 6 to 8 hours or 500 mg every 12 hours In resistant infections combined oral and intravenous therapy may be used

C I tramus ular, 250 mg in 1% procaine solution with 50 units of hyaluronidase added eve y 6 hours may be substit ted for intravenous therapy when required

M thod of Administr tio

250 mg orally very 6 hours appears adequate in most ac te infections G stroint stinal symptoms m y be m nimized by ad ministering the drug only when food is in the stom h or by s mul tan ously administrat ng carboxymethylcellulose Superinfection with ye st in the oropharynx and p rin al area may occur but are p obably secondary infections of local se sitivity r actions

Toxi ity

N usea and vomiting a e common following oral administ ation but this may be avoided by reducing the dose to 250 mg ev ry 6 hours or administering the drug intrave o sly Rashes and st ma titis may occur Loose bowel movements may b observed

OXYTETRACYCLINE (TERRAMYCIN®)

Oxytet acycline (Terramycin®) s derived from Streptomyc s rimo s The comm rcial preparatio s are the hydrochloride and the b se

Indicat ons and Antimi robial Sp tr m (S e tabl n p 514)

O ytet acy l ne i a b ad pectrum antibioti whose range of activity is similar to that of chlort tracyclin It m y be us d in i fe tions d e to gram positive and g am negative cocci gram positive nd gram n gative rods pi ochete i kettsiae and the viru s of primary atypical p umonia lymphop thia vener um and p ttacosis

Abso ption and Excretion

Oxyt tr cyclin in ompl t ly abso bed f om the gastrointes tinal tract Satisfactory ser m lev l m y be maintained by admin istrati n very 6 hours E creti n s principally by the kidneys Signifi nt amo nts ppear in th bile App a nce in the cer bro spinal fluid is delayed and irregular

Dosage and Ro tes f Admi istration

A O al 0 25 to 1 0 Gm m y b gi en orally ev ry 6 hou s

B Intraveno 0 5 to 1 0 Gm may be admi istered very 12 h u s Oral th r py should be u d whenev possibl

T xic tv
M t toxic ffects oc r at dosage lev ls over 2 5 mg /Kg of body wt /day Alb min ria nd nitr g n ret tion a usually v rs ble W kn s drowsiness taxia umb ss of the fing s d f t mpair d pos t on ns bl ring of the vis on d plop a nd y t gm s may occ r Allergi r a tions su h s t hing chilly ens t ons weating d ra he e ob erv d Irritat on at the it of tramus ular inje t n common

BACITRACIN

Bac tra n is derived from the g owth p od ts of Ba illu ubtil

Ind ti nd A timi ob al Sp trum (Se t bl on p 514)
Ba it cin is tiv ga nst gram po tiv occi and p och tes It s ti n s prin ipally bact ri d l Syne gisti a tion with peni cilli and th r ba t r c d l antib otics has been dem str ted aga st staphyl coc i and oth organ sm Ba itrac n is p in pally d top ally f local inf ti s d to s ptibl o gani ms but t m y be d par t ally in the t tment f nfecti ns r s ta t to othe a t b ot o in ombinat n w th oth a tib oti a on of sy e gi t pai It m y b s d o ally in th t atme t of am b l t Most staphyloco i a s s ptibl to b itra i

Do g
A T p al Sol tions o ointm nts onta ning 500 nits pe
B Oral 40 000 to 120 000 units in divid d do e daily f r 5 to 20 d ys
C I t m 1 2500 to 20 000 units ev ry 6 h

Toxi ty
Albumi ria cylindru i and nit og n et ntion c mmonly u aft p re t ral dm ni trat o

NEOMYCIN

N my in s de v d f m Actinomyc s f adii

I d c t s d A t mi ob l Sp t um (S tabl on p 514)
N omy in s m st ctive again t gram negat ve od b t is l o a tive gainst many st ain of gram po t v oc i pa t la ly taphylococ as well a gram po t ve rods Ma y train I P ot s vulga s tiv to neomy in It p ncipal us i loc l in th tre tm t f inf t ns d to us eptible gani ms b t t m y be d oc as nally parent rally n th tr tme t of in f t o d to gani m ist t to oth a tibi tic o may b ed a on of a syn gi tic pa It m y b us d o ally to sterili th bow l b fo gast intestinal s g ry a d n ameb lit s

Ab orpt on and E tion
N mycin s re dily bs b d afte int m s ula inj tio It i poo ly ab o bed from the gast oint tinal t t It rt it prin ipal t v ty in th lumen of th bow l when gi n rally N o

tract reaching a peak serum concentration within 2 hours Absorption following rectal administration is slightly less efficient 0 5 Gm may be adminis red intram scularly or intrave ously every 6 hours Excretion is principally by the kid eys and high concentrations are reached in the urine

Dosage a d Routes of Administration

A Oral Adult 0 5 Gm ev ry 6 h s child en 40 mg /Kg /day
B Rectal 125 to 150 mg /kg (56 70 mg /lb) per day in childre every 6 hours Capsule sho ld be punctured before i serti n
C I tram sc la and Intravenous 500 mg every 6 hou s

Toxi ity

Na sea a d vomiting diarrh a ner ous depression dermatitis g anulocytop ia and aplastic anemia occur occasion lly Therefore chloramphenicol should be used only on definite indi ation

TYROTHRICIN

Tyrothricin s prepared from Bacillus b evis It is used top ally as an ointment o watery s spe sion It is active only against gram posit v organisms Be ause of toxic effe ts on par nt al adm nistrat on its se is limited entirely to the topical treatment of infect d wo ds and pyoderma

POLYMYXIN (AEROSPORIN®)

The polymyxins of whi h B D and E have been given lini al tr al are derived from Ba ill s polymyxa a d rel t d organ sms

Ind c t on and Ant m r bi l Sp ct m (Se table on p 514)

W th the except on of mo t st i s of Prote s v lgari poly myxin i b ter id l ag nst gram negat ve rod d most strai s of Pseudom n s a rug nosa (pyo yane s) Polymyxin s indic ted n vere ystem infe tions d to gram gative rods p t c ularly infe t o s d e t Pseudomo aer ginosa which do not re p nd to oth form of h motherapy It m y b ed as a local applicat on in wounds f t d with sus eptible orga i m It may be g ven orally in th t atment of th higella a ier st te

Ab pt on a d E t

Ab orpt o i ap d ft ntr musc la jection Ex et on i larg ly by th kidney and high n t atio s a hieved the u ine Polymyxin is ot ab orbed f om th ga tr i testinal t a t and wh n t i giv n by mouth it h b ts its principal activity in the l men f th bowel

Dos ge

A I t m ular 1 5 to 2 5 mg /Kg of body wt divid d i to 3 or 4 dose
B Or l 20 mg /Kg of body wt /d y given in 3 o 4 dos s

tiss e in as n and b teremi d not exist Toxic re ctions in clud gastrointestinal i ritat n and occas al skin rashes

D ge Ad its 100 mg or lly 4 tim s daily Child en 5 to 8 mg /Kg /day An i tra o s preparation is now available but its a t lin l and tio a ot y t know

VIOMYCIN (VINACTANE® VIOCIN®)

V my i is de iv d fr m St ptomy puni eus It is active only gainst My ob cte ium tuberc l is in luding train esis tant t st ept mycin aminosal yl c a d and i oniazid Because it is highly n phr toxic and neurot xic t use is very limited T x r act on in lud eighth n ve dam ge and enal in uff c ncy with di tu bed lect olyte balan e

D age 2 Gm intr mus ularly ery thi d d y

NYSTATIN (MYCOSTATIN®)

Ny t tin i d d fr m St eptomyc s ours i It i active again t a w d var ty f fungi and yeast and is v ry poo ly ab orbed fr m th gast o testinal t t s that it a tivity i p in ip lly within the lum n of the b wel whe ve applied l cally Sup infe tion w th y asts cau d by tetr y lin ther py m y b r d c d by ral admini trat on f ystati It m y be used l ally in y st infe t ns f th ge t lia skin

D s g O ally 500 000 units 3 times daily Locally as vagi al ppo it i s (100 000 n t) on o twi e d ly or s tm t (100 000 unit /Gm)

NOVOBIOCIN (ALBAMYCIN® CATHOMYCIN®)

N v b is d r d f m St pt my s ni eu It is a b ad pe t um a t bioti which how id bl exp im t l p omi e It i eadily b o b d f om th gast int t al t act and a hiev very high co entr t s in th s um but i la gely bound to erum p ot

N b is ful i staphyl o al nfecti s es st t to oth tibi t a w ll a i f ti with many othe b te a a d E tam b h st lyt ca

D g ra h s a d e in phil a a mmo R ta e may d l p

D g 0 25 0 50 Gm ry 6 hou o lly

OLEANDOMYCIN (MATROMYCIN®)

Oleandomy in i broad spect m ant bioti d iv d f om St ept myc a tib otic S gmamy in® i ombinat on of l domy in w th xyt t a ycl Exa t l al d t s ha not b tabl sh d

Do g 0 25 Gm v ry 6 ho

mycin is principally excreted by the kidney and appears in the urin in high concentration

Dos ge
A Topical Ointments containing 1000 units pe gram or solutions contain g 200 units per cc may be used locally
B Oral 0 1 Gm /Kg daily divided into 4 6 doses
C Intram sc lar 15 20 mg /Kg daily divided into 4 doses

Toxicity
Renal d mage manifested by albuminuria N trogen rete tion may occ r Deafn ss may follow parenteral administration

ERYTHROMYCIN (ERYTHROCIN® ILOTYCIN®)

Erythromycin is a medium spectrum a tib otic derived from Streptomyces erythreus Its action may be bactericidal or b ct r iostat c d pending on the suscept b lity of the bacteria Resistance to rythromycin may develop rapidly under certain ircumstance most notably by staphylococci For this reason erythromycin should not be used alon in seriou taphyloco cal infectio s

Indi at ons and Antimicrobial Sp ctrum (See table on p 514)
Eryth omycin is active against most strain of gram posit ve cocci gram negativ coc i C d phth iae H infl nzae H pertussis and b llae Activity has also b en sh wn against th virus s of lymphopathia venereum and psittacosis and the rick ttsia of typhus Erythromy in m y b d in inf t ons d to these *organisms as an alt rnative to peni illin nd other antib otics*

Route of Administ at on a d Dosag
A Or l 0 2 to 0 5 Gm ve y 6 hour
B I traveno 0 5 Gm eve y 12 hours

Toxic ty
Na s a vomiting and diarrh a oc u oc on lly

FUMAGILLIN (FUMIDIL®)

Fumagillin is de iv d from Asp rg llus fumigatus H 3 It i directly amebicidal and apparently i effecti e al o against other enteri proto oa It has been val abl the treatm t of drug refract ve amebiasi *Dos g 30 to 60 mg o ally daily for 10 day*

NITROFURANTOIN (FURADANTIN®)

N t ofurantoin is acti e against a wid vari ty of ba te ia both gram p tive and g am negati e It is eadily absorbed from the gastrointestinal tract and e creted in h gh conc tr tion in the uri e Serum and tiss e co e trations are insignifi ant It i s d f th treatment of inf ction of the uri ary tract wh ignifi ant

Chapter 21

DISEASES OF UNKNOWN ETIOLOGY

A a iety of name (coll g n dis a es diffus vas ul dis ses visc ral ang tid s diffu e nn tive t ue d eas s) h v been gi e to a gr p of d sea es which pp a to have in common a path olog c l inv lv m nt of m en hymal tiss es Rh umati fev rhe m to d arthriti di seminat d lup s e ythemato s peri rt r itis nodosa s l od rma de matomyo tis a rocya osis (a ro scle o is) and perh p glomerulon ph tis are th chi f m mbers of thi gro p of ather ll defin d but prob bly lat d dis es of un k own t l gy The diff re ti t n of th se di ord som tim po e a r l linical pr bl m and in many instan es th di g osis can b e tabl hed only afte long ont ed and pai staking obs vati (e page 520) The e is som evid nce that hype ens tivity is ommo d m to i etiol gy altho gh th pathologi al action in th c nn ti t ue p ob bly sed by a w d va ty of injuriou age ts

Clini l Find gs

Cert l n c l fe tu ar comm n to many of the ollag n d s s lthough the m y be o sid bl v i ti n in th s rity xt nt and f qu n y f man f t t on

A C t n ou L sio B tt fly ra h yth ma multiform id d sum

B H mo h g Ph n m n Purpur hem h g

C A t l M f st t on byn v ti thritis arth lg a

D C d In olv m t P c dit s p rd tis my diti doc d t s r a y a te y di as

E V l M if st t on Art i l hyp rten or R yn ud s ph om non

F Lymph t l vol m nt Lymphad nopathy nd splen m g ly

G S In ol m t P lys os t pl ur y p ri d ti p it t

H N mus ul Manif t t on

I H m t l g c Cha g An m leuk ytosis l kop n

J R l in l m t

K Sy t m Co st tuti l M n f t t o F v w ight l fat gu

Labo t y F d g

Th foll w ng ft of sp ci l d g o t c ignif c c

A Sk B p y Cha t i ti histol g h g s may be ob v d in most of th onditi s

B M l Bi p y Ch t i ti hi t l gi h ng oc in p o t t d derm t my iti

C Lup E yth m t C ll D mo t ti The ha ct i tic

ANTIMICROBIAL SPECTRA OF CHEMOTHERAPEUTIC AGENTS

Data re p incipally ba d on vailabl lini l spe l nc and t l xten on in itro te t The d g of hol li ed may b *pplanted furth xperienc* m lat

++	D g of hol	O	N ignifi ti i y	(S)	S lf (P omi
	Alt rnati d g	V	Signif an variati in us ptibili y of in		l P min[a] Di on[a])
±	W k tivi y incon i t da	?	N data vailabl	C	Combined th rapy

Org ism (G m R i t di d i P h)	Di Inf tion	P ni lli	St p my in	T y L C p	Chl mph	E ythromy	P lymyxin	Sulfonamide	B i ra in	em
S h m lyti ( )	S pp ion	++	±V				O			V
St vi ida (+)	S pp ration	++	V				O	±		±V
S f li (+)	S pp i	VC	VC				O	±		V
Staph ( )†	S pp	VC	±VC	V	V		O			V
S ph lb (+)	S pp ti	V	±V	V	V		O			V
D pn moni (+)	P umococ l	++	V				O			V
Clost idium g p(+)	T ta nd ga ga g	++	O				O			O
C diph he (+)	Diphthe ia		O				O	O	?	V
B th i (+)	Anth (Ra)	++	?				O			?
B ubtilis (+)	(Ra)						?		?	
N g ho f ( )	G h	++					O		O	O
N m ni gitidi ( )	M ningi	C	O				O	("	O	O
H infl ( )	Infl l	O							O	±V
H pe l ( )	Wh pl g gh	O	++						O	V
H d yi ( )	Ch id	O				?			O	V
K p umonia ( )	F i dla d pn monia	O	++	V	V	±V			O	
E h. (B) i ( )	S pp	O				O			O	
A roge ( )	S pp	O				O			O	
P ulgari ( )	S pp ti	O	V	V	V	V	O		O	++
P gin ( )	S pp t	O	V	±V	V	O		±	O	V
S typhi ( )	*Typh id f*	*O*	*O*	*±*	*++*	*O*		*O*	*O*	*V*
Salmon lla g p( )	*P ratyph id f*	*O*	*O*		*++*	*O*		*O*	*O*	*V*
Shig lla dy i gro p( )	Ba illa y dy y	O		++		O			O	V
P ula i ( )	T l remia	O	++			?	?	O	O	
F t p ti ( )	Plagu	O					?		O	
B lla group ( )	U d l t f	O	C	++C					O	
B f d lif mi ( )	S pp ion	++	?		?	?	?	?		?
S p ba ill monilif rmi ( )	Ha hill f	++	?		?		?	?	?	?
A bovi (+)	A inom		O		?		O			?
E y pel thrix husiopa hia (+)	E y pel d		?	?	?	?	?	?	?	?
T p llid m	Syphili	++					?	O		
T p	Y w						?	O		
Bo ti ( )	R lap g f		O	++				O		
Spi lll m mi ( )	Ra bi f		O					O	?	
Lep p ra i h m hagi	W l' di		?		?		?	O	?	
M ub culos (+)	T be ulos	O	++					+(S)	O	
My l p ( )	Lepro y	O		?	?	?	?	(S)	O	?
P t i ir	P i ta os		O	++			O		O	O
Lymph pathia um l	Lymphopathia m	±	O				O		O	O
P lma y typi l pneum nia i	P im ypi l p m ia	O	O	++		?	O	O	O	?
Donova body	Cranulom inguinal	O		++			?	O	?	?
Ri k tsia ( ) (tire gr P)	*Typh nd pot d fev*	O	O	++	++		O	O	O	O

† bio in ++ C

a Sodium Salicyl te U S P is most widely u ed
(1) D s 1 2 Gm (15 30 g) very 2 4 ho rs or lly
The d ug should be giv n in sufficie t doses to allay ymptoms and fever and it may be necessary to give ma imum dose to achieve this res lt In an occ sion al p tie t maximum dos s may not b completely ef fe tive There is no evid nce th t intravenous admin ist ation has any advantage o e the or l route
(2) To ic es tions The arly re ctions includ tinnitus n u ea and vomiting Sodium salicylat may be gi n in ente ic oat d 0 5 Gm (7½ gr) pills or with equal do es of sodium bicarbonat to duc gastric irrita tion *Never use sodium salicylate or sodium bicarbonate in patients with acute rheumatic fever who have associated cardiac failure*
b Ac tylsali yl c A d U S P may be s b tituted fo sodium s licylate with th same do ages a d p c utions
c Aminopyri e N F (Pyramido ®) If the sali ylat ar not t le t d this drug m y be sed in do es of 0 2 0 4 Gm (3 6 gr) e ry 3 4 hours Check the WBC very 2 4 d y when giv g this d g
2 The sulfonamides and p nicillin should ne r b u ed in the tr atment of cut rh umatic f ve they are of no v lue and the ulfo amid s may be ha mful
Prevention of relapse - There is some evidence that penicillin may prevent a relapse if used within 12-24 hours after the onset of a strepto-coccal infection
b Co xi ting infe tio If an acut inf tion o curs during an att ck of rh um tic f ver giv antibiotic ag nts ind cat d (se page 514) but avo d giving sulfonamid s

B G ral Measu s
1 B d est should b enf rced until all signs f activ rh u m ti f v ha e disappear d The c it ri for this a
a Return f th t mp atu e to norm l with patie t at bed st and w thout m dicatio s
b N mal s diment tion r te
c Norm l resting puls rate (und r 100 in adults)
d R turn of E g to n rm l fix tio f abnormal iti
2 Gr d al r sumpti of a tivities Patient may b allowed up slowly but sev ral months should lap b f re eturn to full a tivity unl ss the infection w s e ce d ngly mild
3 Maintain g od nut ition

C C ticot opin (ACTH) and the C ti o e Although r th r m kabl sults h b n obs ed n ert a ut h umati fe e p tient tre t d with th s dr gs uch imp ov m t is ofte only t mpo ary The m y b a p mpt di ppear e f fe e m lai e t hy di and polyarthriti Abnormal Ecg hanges (p olonged P R int val) and bl od s dimentati n ate m y r turn to n m l limits within a w ek Optim l d ag ch dul and influen f the drugs on th d v lopm t of ub q nt ca dia l sions h v not be stablish d (S e p 423)

D T e tm nt of Compli ation
1 C ng st failur T t as f r ong stive f ilur (se p g 182) with th f llowing ari tions

polymorphonuclear leukocytes (with ro nd vacuole partially filled with nuclear material) in ma row a d peripheral blood smears suggest disseminated lupus

D Antistreptolysin Titer Demonstration of changing A S titer may p ovid etiologic information regarding background of previous streptococcal infection which is of especial val e i the diagnosis of rheumatic fever

E C reactive Protein (CRP) The test for this abnormal serum p otein is said to provide a sensiti e index of inflammatory activity

Rheumatic fever and Syd nham s chorea will be disc ssed in divid lly The treatment of other diffuse collagen diseases will be discussed collectively Acrocyanosis (acrosclerosis) has been in cluded in this group for purposes of differential diagnosis although it is doubtful that it is a true member of the collagen dis as group Rheumatoid arthritis has been dealt with in Chapter 12 (see page 311) glomerulonephritis in Chapter 11 (see page 293)

RHEUMATIC FEVER (code No 010 932)

A gen ralized dise se of unknown etiology usually coming on 1 3 weeks after an acute infection with the hemolytic streptococci and manifest d usually by pathological chang s involving the h art blood v es ls and serous su faces primarily the joints It has a marked tend y to recur

D agno i

The diagnosis of active rhe mati fever can us ally be m d if the patient ha 2 m jor manif stations or 1 major and 2 minor manifest tion of the disease (Jones)

A *Major Manifestations*

1 D fin t pa t hi tory of rh umati fev r
2 Signs of active carditis (including E g changes)
3 Inflammatio of joi ts
4 S bcutaneous nod les
5 Chorea

B Mino M nif st tion

1 Fever
2 Eryth ma m ltiform
3 Abdominal p in
4 Pre ordial pain
5 Non traumatic no e bl ed
6 Purp a
7 Pneumonitis

C Laborato y Tests May show increased sedime tation rat a inc ased a tistreptolysin titer C reactive prot in leuko cytosis a d a emia and abnormal Ecg

Tr atment (See pag 167 f r t tm nt of rhe m ti h rt dise se)

A Spe ific M asu

1 S licyl te ther py The salicyl t s m kedly reduce fe er all viate joint pain and possibly reduce joint sw lli g There is no evidence that th y ha e any ff ct on the n t r l cours of the dis ase *The salicylates should be continued as long as necessary to relieve pain swelling or fever If withdrawal of the drug results in a recurrence of symptoms they should immediately be reinstituted*

mo t atta ks of ac te rheum tic f v If this pro es t ue p ompt pe cillin t eatment of any pper r spir tory infection i uscept ble i dividual may be adequ te pr phylaxi

CHOREA (Sydenham s) (code No 930 196)

A les ommo m nif stat n of rheumat c d sease ch ac te d path log cally by g er l zed edema and congestion of th b a and by i v lv m t of the b sal ganglia with v scul r throm bi fo l h m rh g s p riv cul i f ltration nd hro natolysis f e c lls It occurs mo t frequ tly in fem les in th sec d d d and i char t ized by j rky re tl ss ch elfo m mo m ts and t t m s by dysarthria

T atm nt

A Sp if M s es N e k own Corticot opin (ACTH) a d ti e pp to be f be f t in many ca es of h It mu t b gi e in rel t vely high nitial dos g a d m rked s d um st i tion mu t b mpl y d

B F e th py may be mployed if all lse f ils This may be gi n by e the of 2 m thods Hyp th rm app atus with t mper tur 39 5 40 5 C (103 105 F) for 3 5 hou s twi w kly fo 6 10 tre tment typh id v i e I V d ily f r 5 7 d ys

C G e l M s es

1 G l sympt mati me ures and g od nursing r f m st impo tan e

S dati with Ph barbit l U S P 15 30 mg (1/4 1/2 g) t i d q i d m y b helpf l

3 If vul i e i app M g um Sulf t U S P 4 10 c (1 2 1/2 dr) of 10% s lut o I M o I V m y be us d Wh admini t i g magn ium lfat I V lw y ha e a yr g f ll d w th 10 f 10% lut n of c lc gl c n t o oth lcium It eady to dmin t I V if n sis occ r or sp t o c a

OTHER DISEASES OF UNKNOWN ETIOLOGY
OTHER VISCERAL ANGIITIDES (Diffuse Vascular Diseases)

Ac o y no (d No 099 518)
Diffus s lerod rma (ode N 114 971)
Diss m t d l p ythem t (d N 110 0) Disti gu h f m h on dis d l pu yth m t u
D m t my t s (od No 2 4 100)
Pe ia t tis od (od No 460 190)

D gno i

S tabl on p ge 520

T tm t

A Sp cifi M s e None k ow Suppo tiv t tm t with t t p (ACTH) th o ti on s may gi e som b efit lthough ults a va iabl I me s the eff t i quit d fi it d d am ti p cl lly i th e ly ph of

a Low sodium diet (see page 55) and mercu ial diu etics (see pag 204) are of partic lar value promoting d u resis and treating failure in acute rheumatic fever
b Digitalis is generally not as effective in acute rheumati fever as in most cases of *congestive failure* and the dr g may accentu te the myocardial irritabil ty producing arrhythmias that further embarrass the heart
c Many c ses of congestiv failure are due t acute myocarditis These cases oft respo d dramatically to corticotropin (ACTH) or the cortiso es When these agents are u ed for this co dition m ximal sodium re striction (under 200 mg daily) is imperati e

2 Pericarditi Treat as any acute non purule t peric dit s (see page 188) The rheum tic eff sion is sterile and ant biotics are of no value The g neral princ pl s i clud e lief of p i by opiates if n cess y and r mo al of fluid by ardiac paracentesis if tamponade d velops If parace tesis is perfo m d it should be preceded and follow d by a short o rse of peni illin therapy to preve t contamination of the peric d um ACTH and cortis ne as well as salicyl tes should be cont nu d or sta t d as they seem to ha a sp ci fic and favorable effect in aiding resorption of th fluid

Prophyla is

Th p nciples of prophylaxis r to avoid hemolytic strepto coccal infection nd to give immediate treatme t with th antibiot c ag ts if a streptoco cal infection occu s

A Gene l Me u s
1 Avo d cont t w th persons who hav colds r upper respiratory infe tions
2 If po sible l v i a wa m limat

B P vention of Inf t on Tw m th ds of p phyla is are now ad ocated
1 *Penicillin* O l p nicill n in *doses of 200 000 250 000* units every day befo e breakfa t o Ben athine P icillin G U S P (Bi ill n®) 1 200 000 u its I M o ce month This is ad o at d specially for children who h ve had o o more acut heumati f er att cks a d hould be gi e thro gho t th hool year Ad lts should e ei e this fo bout 5 yea s fter a ttack f cute h umati fe er I any ase it hould b given to these individu l between Septemb r d Ju
2 S lfo am d s If peni illin is not a il bl give s lfadiazine 0 5 1 0 Gm (7½ 15 gr) daily thro ghout th y a *Patients receiving sulfonamides should have fre quent blood counts urinalysis should be performed initially and at least every 4-6 weeks thereafter If there is any tendency towards leukopenia the drug should be stopped immediately*

C Tr tment of streptoco cal so thro t sho ld b ied o t by g of the a t biot cs It has been hown that p mpt the apy (within 24 hour) f t ptococcal i fe ti s by 600 000 900 000 units of Be athi Penicillin G U S P (Bicillin®) I M or 300 000 600 000 units p ocain penicilli with al mi um mo o stearate in oil I M e ery third day for 3 i j tio s will p e e t

the illnes Other patie ts h ve received temporary be efit during acut episode A f w pati nts s m to be only del te riously affe ted by t.ose ag ts Suggested dos g schedul s are mparable t those employed in heumatoid arthritis (s e p ge 315)

B General M asur s
1 Di t H gh alori high vitamin diet
2 Blood transfusions m y be us d if anemia is p es nt Iron salts may also be tried but are usually ineff ctive (page 219)
3 Protect gainst exposure to sunlight or oth r strong light (Dis minated lupus rythem tosus and d rmatomyos tis)
4 Protect gainst exposure to cold (Scleroderma with Raynaud s phenomenon, s e pag 210)
5 Prot ct against se ondary in. ctions During the acut feb-ril phases of diss minat d lupus d rm tomyositis and p riarteritis nodosa, th administration of peni illin or other antibiot s may help to prevent s ondary inf ction pecially to pneumonia organisms
6 Physical the py m asur may be indi ated in the manag ment of joint and periarticular manif stations (s pag 323)
7 Salicylat and other analg i s may be employed p r n
8 P oper are of skin is indi at d S ftening ke atoplastic ointm nts may be benefi ial in scle od rm (se page 106) For are f les on of lupus rythematosus ee p ge 83
9 If enal insuff ciency is pr nt tre t a ording to g neral princ pl on pag 300

P gnosis
Dis minat d lupus rythem tosus and pe iarteritis nodos usually run a pid downhill our with a f tal outcome in 2 years Corti ot opin or cortison th rapy appears t p olong lif in a f w patients Relaps s and r mi sions occur fr quently in dermatomyo-itis and 50% of p t nts ove spontan ously Scleroderma is slowly progres ve and d bilit ting Acrocyanosis has a better p ogn sis than dif use scleroderm

DIFFERENTIAL DIAGNOSIS OF VISCERAL ANGIITIDES (Modified after D Bohr and J Wes er)

	D min t d Lupus E yth m t	De m t myos t	A ocyan j (A l l)	Diffuse S l ode m	P t t Nod a
Ord f f qu y	Se d	F th	F t	Th d	F f h
P (p) ting f t s	Sunl gft inf t n t m	Sur light inf t t m	E p t d motion t p t	+	Hype s iti ty
Sy t ar ymptom	++++	++	0	±	++++
Skin	E yth m tou ash on f o ext m ti	Dif f c l d ma E yth m ve in volved m l	Skin bound down nd ov fa xt miti s nd Ac ocya si ra ly inv)	of pigm tation ppe h at s hands d f et	Sub utaneou nod l long o e of essel Urti ari E chym e
Lymphad opa hy	++	++	0	0	±
M l p l t d	±	++++	0	0	+
J i t l tion (infl m)	+	0	0	0	+
V l oc l i	±	0	0	+	±
R y d ph m on			+	±	+
C N S in l m t	C b l hang	0	0	0	C k l and p ph l
P i d i ff ion	+++	±	0	0	0
Myoc d l l ment	++	++		0	+
E doc d l (valv) m t	+	0	0	0	0
C ona y (in) m t	±	0	0	0	+++
Lung	P ural eff ion Secondary p umoni	S da y p moni	Fib os Lung yst	0	S onda y p umoni
P ton um	A t P pl iti and pe ih p i ti	0	0	0	D sational hem h g
I mani i tions	±	0	Dy phagi	0	Abd mi al p in hem h ge a ee omiting
le m g ly	±	±	0	0	±
p m g ly	++	±	0	0	
on t l gi l manif t tion	A mi and l uk p ni	E in ph lia, l uk peni (±) and an mia	0	0	Eo inophili m k d l ukocytosi anemi
S dim tion r t	Ele t d	±	±	El t d	El t d
U inaly is	N ph i i hang	N ph l hange	0	0	N ph it h ng
S rum p ot in	Glob l i d	Glob li in as d	G ob l i d	Glob li d	Alb mi d d
S ecial studi s	D m t all f L E cell and skin biopsy	M l bi p y U inary i s	0	Skin b p y	M l biop y

FROSTBITE (code No 0 -448)

Frostbit is i ju y of th uperfici l ti su s due to fr zing it m y be di id d t thr e grade of se er ty
1st degr e Fre zing without blist ring or p el ng
2 d d g e F ing w th bl t ring o pe li g
3 d d g ee F eezing w th de th of skin and/o d p r tis u s
In mild c s s ther is numbn ss pri kl ng and it hing With in r as g e e ity the may be pare thesias and st ffn ss Du ing th wing t nde ne s and b ing pain a present Th skin i white or y ll w in c lo nd the e is stiffn s and imm bility Edema bl t rs ne o is and g g en m y appear

T eatment
Th e has not b n suff t nt lini l experie e to c cl s ely e lu t v ri u t e tm it m thods i e it is diffi ult to d te min th du tio a d d gr e f expo ure and t ctly as ess the e tent a d s ver ty f injury wh n the pat t is fir t e n

A Immediat Tr tment

1 R w m g Th matter f ew rming is cont v rs al si ce p t nts ar s ld m seen whil i th f z n t g Cust m h s d ct ted advant ges to sl w ewarming but re e t x p riment 1 w k gg sts th t mor r p d th wing t t mp atur sl ghtly abo e body he t may s lt in significant d r s in tiss e n r sis It h b n s gg t d th t re w ming is best a complished by imme s ng th f o en p ti of the body f r eve al minutes in w ter heated t but n t m th n 108 F (42 C) Afte thawing ha occu d and th p rt h s etu ned to n rm l t mpe t re xt nal h at should b r m v d

2 P otection of th local p rt
a Avoid ll p ss bl t uma p e sur o f i t on Avoid phy i l ther py in the rly st g
b K p t b d r t with ff t d p t le t d d r d at o m l oom t mp tu Avoid d e t o t ct with bed line bla kets a d lothi g
c A d a t p sur d e i gs and g e y bandag s
d Local tion m y be tr t d w th mild o k w th o without a ti infe tive g nts
e P ophyla p ni illin i j t ons a e prob bly dvi abl If ul ratio has oc u ed pp op i t anti tet u t eatm nt i sugg ted
f A ti agulants Th val e of anti oagulants i o tro r al If u h treatm t is to be f valu it must b in stit ted within d y afte th wi g R pidly a ting h p di m (ee p ge 215 fo do ag) is admini t ed to m i t in c tinuous prolong tion f th clotting tim for period of bout e w k Thi m y b s ful in p ev ting ond y th mbo e in s r ounding r e
g V sodil tors T e ag nts h ve not pr ved to b p ti ul ly valuable

B Follow p C r

1 M ld p g e ive physical the py is important a the h l ing p oces oc u
2 B g e is s m y be in tit t d wh n tole t d (p g _09)

Chapter 22

DISEASES DUE TO PHYSICAL AGENTS

DISORDERS DUE TO COLD

Exposure to cold produces immediate localized vasoco strict o follow d by gen r lized vasoco istri t on When the skin temp rat re *falls to 25 C (77 F) tissue metabolism is slowed but the demand* for oxygen remains greater than th slowed circulation can supply and th rea become yanotic At 15 C (59 F) tissue metabo lism is markedly decreased a d the disso iation of o yhemoglob is reduced giving a pink well oxygenated appearan e to the skin Evid nce indicates that tissue survival at this t mperature is slight Tissue death may be ca sed eith r by schemi a d thromboses in the smaller essels o by actual freezing with the formation of ce in the tissues Free ing does not occur until the skin temperature drops to -4 to -10 C (25 to 14 F) o even lower depe ding on coexisting fa tors su h as wind immobility venous stasis mal nut it on and oc lu ve rt rial d s a

Prophylaxis

1 W ar warm dry clothing p ef rably several l yers to afford addition l insulation w th windproof out garment
2 K p dry when possibl r mov wet clothing s cks nd *h s and replace w th tho oughly dried on s*
3 Avo d cramped positions constricting clothing and p o long d dependen y of feet
4 Exer ise arms legs including fingers and toes period c lly to m int in ci cul tio
5 Avoid wet and muddy g ound nd k ep shelt ed from wi d
6 Maintain good ut ition and cleanliness of skin

CHILBLAINS (code No 0 448)

Chilblains are red tching skin l s s lly on the e tremi ties ca sed by exposure to cold without actu l freezing of the tis *s es They m y be as* ociated with d ma o blist r ng and a e aggravat d by the application of warmth In th hron f m u cera ive or hemorrh gic lesions m y pp a and progress to scarring fib osis and at ophy

Tr atm nt

1 Protect affected area from traum and secondary infectio
2 Do not r b or mas age injured ti su s or apply i r heat
3 El vate affe ted p rt slightly and allow to w m g d ally

Prophylaxis

1 Avo d unnecessary exposure to he t
2 Maintain adequate fluid and salt intake using 0 1% saline as drinking water or salt tablets and wat r
3 Incr ase activity slowly until acclimati ed
4 Wear loose fitting clothing (prefe ably white) which i permeable to moisture
5 Avoid alcoholic indulgence excessive fatigue loss of sleep or int rcurrent infe tions Maintain good nutrition

HEAT STROKE (Sunstroke) (code No 010-453)

He t stroke is a rare disorder due to exposure to high temper atur s which is characterized by sudden l s of consciou n s and by failure of the he t regulating mechanism as manif ted by hyper pyr xia and c ssation of sweating There may b premonitory head he dizzines naus a, and visual disturbances The skin is hot flushed and dry and the puls is r pid i regular and weak Th rectal t mperature m y be as high as 108 112 F (42 44 C) Hydr tion and salt cont nt of the body ar n rmal

T e tment

Aimed t redu ing high temperatur

A Em gency Measur s
1 Plac p tient in a hady cool place and remove clothing
2 Cool patient by fanning aft r sprinkling with water
3 Imm r e in old wat r u e ice p cks or i e water enemata to r duce body temper ture Do not lowe body temp atu b low 102 F (39 C) too rapidly
4 Mass ge extr mities to m intain circul tion
5 Avoid sedation sin this furth disturbs the heat regulating me hani m unl ss pati nt is having nvulsions
6 Physiol gi al salin 1000 cc (1 qt) I V v ry lowly

B Follow up Avoid immediat re xposure to he t Hyper en i tivity to high temper tur may r main for a considerabl tim

HEAT EXHAUSTION (Heat Prostration) (code No 010-445)

Heat exhaustion is du to inad qua y or oll ps of the p i phe al cir ulation se ondary to salt d pl tion and d hydr tion fol lowing sust in d xposure to h t Th symptoms include weakness diz ines tupor head h w th or without mus l ramp Th skin is cool and pale and ther is profuse p pir tion oliguria tachycardia, with occasional m nt l confusion and muscular in o ordination Labo at ry tudi eveal h mocon nt tion and alt d pl tion

Tr tm t

A Emerg cy M sure
1 Pla p t nt at st in a ool h dy pla e
2 E vate fe t and mas ag l gs
3 Sodium chl ide 0 1% solution, by mouth o physiologi al aline 1000 2000 cc (1 2 qt) I V

C Surgery· Surgical amputation should not be considered until it is learly established that one is dealing with non viable tissu Tissue necrosis even with black eschar may actually be quite superficial and there may be viable skin underneath which may heal well

Prophylaxis

See General Section on page 522

IMMERSION FOOT (Trench Foot) (code No 096-44x)

Imm rsion foot is caused by prolonged immersion in cool or cold water or mud and is characterized by cold anesthetic extremi ties which become hot with intense burning and shooting pains dur ing the hyperemic period The affected extremities may be pale or cyanotic with diminished pulsations during vasospastic period followed by blistering swelling redness heat ecchymoses hemorrhage or gangrene and secondary complications su h as lymphangitis cellulitis thrombophlebitis

Tr atm nt

B st instituted during stage of reacti e hyperemia

A E rly T eatment
1 Protect extremities from trauma and seco dary infection Do not rub or m ssage feet or legs or apply ice o h at
2 Keep f et el v t d to aid in removing edema fluid
3 Protect pressure sites (e g heels) by use of pillows
4 Warm extremities gradually by exposure to cool air Do not moi ten skin or immerse in water
5 B d rest early and until all ulce s ha e healed
6 Penicillin should be us d if infection develop (see pag 502)

B After r Tr at as for Buerger s disease (see page 209)

Prophyl xis

S e Gen r l Se tion on p ge 522

DISORDERS DUE TO HEAT

Exposur to he t results in prompt vasodil tation increased cutaneou cir ulation in reased cardia output and we ting The resultant circulato y instability may lead to syncope in th erect position but muscula activity us lly preve ts th syn op Fluid loss through sweating may amount to 3 o 4 liters per hour with he vy work at high temperat res The salt ontent of sw at in r ases with rising temper tures ranging between 0 2 and 0 5% A climatization us ally results after 8 10 d ys of exposu e to high tempe atures but v n a fully acclimatized individual m y suffer a breakdown in the e e t of exc ssive fatigue inte curre t infection alcoholi indulg nce loss of sl ep or f il re to maintain hyd ation salt intake or calo i intake Breakdown m y be d to inad qu cy of the irculation (circulatory fail r) or to a failu of the sw ating mechanism Cess tion of swe ting is a very important sign and may indicate impending stroke or collapse

A Em rg n y M s es (S p g 28 f t tment of sh k)
1 Pl m t ansf o at once A rough timate f pl sma n ed m y be det rm ed by o e of the following fo mul e Admin st 100 cc of pl sm
a For e h 1% in eas in h m t rit b v 40%
b For ea h 100 000 inc ase in RBC bov 5 million For e h 2% in ase in Hgb ab ve 100%
H man m lbumin app opriat do g may b sub st tut d f r pl sm whe va l ble this d r es pos b lity f t ansmitt ng h p tit (page 26)
2 Bl od t an f ns f blood lo s has oc urr d

B S g al M s r e
1 Cl a s g and d b idem nt (A pt c tech th oughout)
a A e thet z p t nt if n ssa y
b Cleans b rn and urroundi g ea *g ntly* w th p nd t il saline Do t r b vig o sly Eth o b ne may b us d to r move g se o l Remov o ly loo nd n roti t ue If n ess y to ope blister do so sept lly
d *Do not a ply tannic acid silver nitrate or sulfonamide powd rs to burned area*
2 P s r d sing (Mai tain st t a ps s)
a C r w th st ril petrol t m r mil g u st ips
b Apply g e p d d fl ff d po ges Band g snugly w th oll bandag d o er w th otto p g s o teril ma h nit t w t (May b t t te Kerle ® oth r fluffy typ of b nd g f th t p)
d Apply p es u e mu l t ki ett la ti band ges R m e aft 10 14 d y Pr p e f ski g aft
3 Op i t tm nt i b i g u ed ga but th pr ss dr ss g the m st mmo ly mpl y d form f th apy

C G l M r
1 P ll n l M if inf t on i s p cted (p g 502) Tet s d ga g g ant tox p n (s pag 471)
3 Fl ds t m ntain in y tput t 1200 1500 d ily
4 S d m hl id 8 1 Gm (2 3 d) d ly
5 Pla ma bl od s e d d hyp p ot i mia m y o lat
6 High c l (3500 C l) di t with added v t min (s e pag 58)
7 Th pla of t t pin (ACTH) d th o t o es tl man g m nt of b i n t l Th i ff t the ute b do t pp t b d m t o sg lly ported Th y m y h v g t r v l d ing th ph s of h ling

ELECTRIC SHOCK (code No 010-460)

D t t m ch l d g o s than lt t ng r t Alte t g t of high f q y high v lt g may b le s dang tha l w f qu y low olt g With lt ti g ur e t of 25 to 300 y l s low olt g (b l w 2 0) t d t p du e t c l fib llati high volt g s (1000) r spi to y f il int m d te v ltag (220 1000) b th El ct ic b s a s lly h ply d m rc ted ou d o val pal les g y r with t cl t d infl mm t y e ti Littl happ s to them fo ve l w k l ghi g th n occu slowly a d in a f ly wid a e Elect i shock m y p oduce los of o ous s wh ch

4 Treat shock when present (s e pag 28)

B Follow up Avoid immediate re exposu e to heat

HEAT CRAMPS (code No 270 445)

Heat cramps a e painful spasms of vol nt y muscles of ab domen and extremities due primarily to salt depletion and following sustained exposure to heat The sk n is moist and cool and muscl *twitchings may be pr t The temperatu e is norm l or only* sl ghtly increased Laborat y studi s reveal h moconc ntration and low serum od um

Tr atm nt

A Em gen y M sures

1 Sod um chlo ide (tabl s lt) 1 Gm (15 gr) e ry $1/2$ 1 hour with abu d nc of water or sal e olution by mouth or 1000 c (1 qt) phys ologi l saline I V This usu lly r l e s att ck promptly

2 Have patient rest in a cool shady pl e

3 Mass ge o muscles gently

B Follow up Rest for 1 3 d ys d pending on sever ty

BURNS

Burns a tissue inju due to he t and may b graded as follows

1 t deg Erythema w thout bli t ring (code No 13 4411)
2nd deg E yth ma with bl stering (cod No 13 4412)
3 d d gree D st ction of d ep t ss (d N 13 4412)

When tis a burned plasma lo t nto th burn d rea *and f om th su f* of the burn Thi l ads to *hypop* ot inemia which em s as l ng as a granul ting urfa e s p sent and the g anul ti g surfa heals poorly as l g s the is hyp pr teu *em a The loss of plasma r sults in a duced blood vol m* hemo on entrati n low rdia output d ased bl od flow ol gur a elevated N P N and l ukocytosi Tho gh anemi m y o u at *th time of th bu n du to r b dest u t n it mo e ommonly* be om s pp rent bout th fifth d y a h modil t n b gins and s the ff ct of blo d destru t on and impaired b f rm tion make themselves app nt *S cond y nfe tion s prone t occu* nd must be tr ated promptly D ath m y sult in n dult wh n 30% o m re of the b dy urf s invol ed In n fa t 10% may b soci ted w th *very s v ell t*

Th ours of a sev e bu n m y b di id d a follows

1 Imm diat shock (r g ic)
2 Bu n sh ck (*f r t 48 h urs*)
3 Tox m a (o curring b ut 3 d d y)
4 Sep is (bo t 3rd day)
5 H ling d r *stor tion of f* ction

Tre tm nt

Take blood pr ssu p *l hemogl b RBC* h mato it and plasma protein at tart f th rapy and at g l i te l

l ss often o lower abdomen or thora and rar ly over the t emiti The patie t s psychological r ction to his ill ess pl y a important co tr buting role

T tm t

A Spe ifi Me ur

1 R s ran d xplanation
2 Py idoxine Hydrochl rid U S P 50 100 mg ($3/4$ $1 1/2$ g) I V may be gi en b t r lts a e u ually d ppoint ng
3 S dativ (s page 39) and nt na s ant (s page 42) drugs may be employed
4 Dim nhydrin t U S P (Dr mam e®) 100 mg ($1 1/2$ gr) 20 60 m nut b f re and r p ated 1 $1 1/2$ d $4 1/2$ hou s aft therapy

B Ge l M asu

1 Ge e l uppo tiv meas es Wh n pati t re d b litat d symptomat m su s m y b of gr t v lue
El ct olyte o fl d balance Co r t a y def i ci s
3 T ansfus with whole blood if anemia i p ent

IRRADIATION SICKNESS CAUSED BY NUCLEAR RADIATION (ATOMIC BOMB)

Th symptom dos ge rel tion hip ar e w th d e lev ls A fa as is known th are no perman nt du in mild cas if e o e y occurs

T atm t

The is no known pe if c t tm nt G al suppo t ve m sur with complete bed t d qu t nut tion us f anti b otics when indi at d and blood transfus on wh n ytopenia occurs a all th t can be off d at p nt

P ophylaxi

Th most imm di t dang r of an atomi xpl io is th th r mal burn Thi an b minim ed som wh t by f lling to the gr und o ring th xpos d p rt of th body o s king shelt behind a building w ll tr t fo the 10 s ond immed t ly aft r the bomb xplo ion Th f llowing are m asu e advoc t d by the At mi E rgy Commi sion t minimi e xp p e to r di tion

A Clothe will p v t a of mu h of th m t i l to the skin A y ont min ted cloth s should be disposed of soon s p s bl and b f t ing a non ontaminat d a

B Cl ans All Expos d Ski

1 V g ou rubbing w th oap and w ter r p fe bly syn theti det g t p ying particul att ntion to th h ir l skin fold and ar as about body o ifi s will chi ve f ir d gr f d contamination *Do not abrade skin and d t use contaminated wat r*
2 If s p and w ter ar n t eff cti e Isotoni saline t pH 2 0 o a mixtur f b lum sulf d and sta ch will be us ful Sodium bi arbon t lution i also r ommend d espe ially f r muc u memb an s
3 In an m rg cy wipe kin with any non ontamin t d pape ls sand st w grass leaves et

may be momentary or prolonged With recovery there may be muscular pain fatigue headache and nervous irritability The physical signs vary according to the action of the current With ventricular fibrillation no heart sounds or pulse can be found and patient is unconscious The respirations continue for a few minutes becoming exaggerated as asphyxia occurs and then ceasing as death interven a With respiratory failure respirations are absent and the patient is unconscious the pulse can be felt but th re is a m rked fall in blood press re and the skin is cold and cyanotic

T atm t

A Emergency M asures

1 Free from c rrent at once This may be done in many ways but rescuer m st protect himself in the process Turn off power ver the wire with a dry wooden handled axe mak prop r ground to divert current or drag victim c refully away by means of dry cloth g or leather belt
2 A tificial r spiration must be st rted immediately (s e page 150) if victim has slow or absent breathi g and conti ued u til sp tan ous breathi g returns or rigo mortis sets in
3 Precordial compression for ventricular fibrillation or arrest Artificial respiration will not restore normal heart beat and other measures may not either If possible in cis on of the h st and manu l pumping of the heart may be mployed as a last resort Electric defibrillators may be mploy d if by cha ce available
4 Tr at shock promptly (see p ge 26)
5 Positive pressure o ygen with carbon dio ide may be used wh n ava lable or oxygen and carbon dioxide by mask com bined with artificial respiration

B Hosp tal Me sures

1 H sp tali pat ent *when revived* and observe f r sudden card c dilatation or secondary hemorrhage
2 Lumbar puncture if signs of increased pressure are noted
3 Tr at b rn onservati ely The direction and extent of tis ue injury may not be ppare t fo weeks Infection is usually not a problem e rly Patience and delay are impor tant in t eatment allow g an lation tissue to be well estab lish d before attempting any s rgery Hemorrhage may occur l t and may be vere

IRRADIATION SICKNESS

Irr di tion sickn s is the term applied to the syndrome dev l oping during o after th course of th rapeutic x ay administr tion or after exposure to ionizing radiation (e g x rays neut on g mma rays alpha o b ta particles)

IRRADIATION SICKNESS ASSOCIATED WITH IRRADIATION THERAPY

Ano exi n a, vomiting weakness e ha sti n las itude and in som cases prostr tion may occur singly or in combin ti n and may be of varying severity The symptom compl is most l k ly to occur when *x ray th rapy* is gi n pper

Collect and s v washings in clean c tainers fo toxi o l gi e aminat on when dicated In f e sic ca es s al w th ealing wax and pla e in a locked r frigerato deliv r to toxic logi t pe sonally a d g t a sign d rece pt If re fr ge t n i la king pre erv the sp cimen w th equal quant ti of 95% alcoh l do not e formalin as this int fer s with toxicologic xami tion

4 Gastr la ag fluids (1) Wa m tap wat or 1% saline (2) Thin sta h pa te ol bl (3) Sodium bic rbo te 1% (4) Pota sium permang ate 1 2000 (1 Gm in 2000 wat) (5) Sodi m th o ulf te 1% (6) Hydrog p ox de 1 or 2%

C C tha is May b ff tiv in ret ding ab ption

N t al t on (I ctivation) of P s P or to Intest al Abs pti n
Ex pt in s of t g a d or alkal s alw ys f ll w w th g st c l v g

A N ut al ation of Ac d d Alk l s See sp f c po s
B P cipit t on f Ch mi l S e pec f poiso
C I t t by D mul nt D mul nts p ipitat metals and l h lp dimin sh ab pti of many poisons Th s bland g nt a e als oothi g t inflam d m o memb anes U 3 o 4 aw gg whit be t in 500 c milk o water kimmed milk thin flour st rch solut n (bo l d if pos ble)

S pp ti a d Symptom tic M es
Th v t m of a ute p n g m t be k pt unde clos linical b rvati n in o de to ticip te the imm di te and d lay d com pli at o s f the p isoning Sui dal pat t may d p ial s r eilla c and should b pla d d the a of a p ychiat i t

A C culat y Fail e
1 Sh k (s p g 27) Th prin ipal m includ re cumb nt po t n wa mth dministration of tim lants and p r t al fluid to n effectiv bl od v l m
2 Ca di f il e (p ge 181) The p in ipal m ur in l d oxyg n d git li m r l d ur tics and ra ely tr ardi p n ph ine
3 Pulm n y dem The p p l m s in l d oxyg n p i lly by po ti e p ssur (p g 147) o t eatm nt fo di failu f t xi t vo d p nt al alin o oth p t l fluid (x ept pl sm)

B R p tory Abno m l t
1 R p tory b t tion Co t by opharyng l irway i tr t h l int bation o t h otomy
2 R p t y d p i Pla in op n ai Admi t a tifi ial e pir t p R us it to o oth r mean of tomat ntil ti sh uld b mpl yed soo a po ple St mulants (anal pti dr g) a of q ti abl val e n w th C N S d p s ant drug
a W m st ong bla k off o ally o ctally
b W m stro g t a o ally
A omati pi it of ammonu 2 4 (1/2 1 d) in 1 c P f w t
d Eph dri lfat 50-120 mg (3/4 2 g) orally o b ut N k th mid inj tio (C mi ®) 0 25 1 25 Gm (3 3/4 18 3/4 gr) I V

DISEASES DUE TO TOXINS

PRINCIPLES OF TREATMENT OF ACUTE POISONING

In the emergency treatme t of a y poisoni g in which the toxin has been taken by mouth the following g neral procedu es should be carri d o t (1) Remove poison by emesis la age catha si or diures s as soon as possible (2) I activate poison with specif c or general antidote Follow with lavage (3) Combat shock c llapse and specific manifestations as they a ise (4) Protect mucous mem branes w th demulcents

Removal of Poison

Do not u e stomach tubes or emetics in poisonings due to strong acids or alkalis or other corrosive agents they may cause gastric perforation

A Em s s This is the quickest way to evacuate gastric co tents
1 Indications Fo emo al of *excess* poison in cooperative patients or f r convenience when a stomach tube is un ail ble or patient is unable to take stomach tube
2 Contraindications (1) Drowsy or unco scious patie ts (danger of aspiration of stomach contents) (2) I ge tion of co rosive po ons kerose e or convulsants
3 Technic Introduce finger feather or other object into throat or gi e one of the followi g and f llow with copio s quant tes of warm w ter (Emesis should be co tin ed unt l gastri contents are clea)
Apomo phine hyd ochloride 5 mg (1/10 *gr*) *s* bc t will ften qu et the patient a d will usually ind ce omiting
b Powd r d mu tard 1 3 tsp i a glass of l kewarm water s an un rtain and unpleasant emetic b t is oft n s f l and ha the advantage of b ing generally available
c Sodium hloride 1 Tbsp in a glass of l kewarm water is not v ry eff nt b t is re dily a ilable
d St ng so p ds 250 500 c

B G t ic Aspir tion and La age
1 Ind c t ons (1) R m al of xces of nonco rosi e pois n *which may l ter be abso bed f om the g st intestin l t act* (2) Removal of C N S d pre sant poiso when vomiting does not o (omiting ce t r p ly ed) (3) Fo collec t on a d e aminati n of g tric co t ts for id ntifi ati n f po s n (4) For con enient administr tion of antid te
2 Contr ind cati s (1) Extensi e co ro io of tiss es by poi on (2) St ggling delirious at poro s o comato pati nts *be ause of da ger of spiration p e moni*
3 Technic Gently insert a lubricated soft b t non oll psible stomach tube th ough the mo th r nos into the stomach *Lavag* op o sly but d not distend the stoma h Und r s m ond t o s it is better to lav g with a small qua tity of fl d at f equent intervals *Always remove excess of lavage solution*

sw llowed a c rosi e poison (symptom sev e pain burn ing s sation i mo th a d throat vom t ng) CALL PHY SICIAN IMMEDIATELY Acid d acid like co rosiv in lude sodium a id sulfate (toilet bowl cl a ers) acetic acid (gla al) sulfu i acid nit ic acid oxalic cid hydrofl o ic a id (rust r mo s) iodi e a d s l er n t ate (styptic p n cil) *Alk li rro l es includ od m hyd ox de ly (drain* cl s) sod um carbonate (w hing oda) mmonia wate nd od um hypochlo ite (household ble h)

If the p tie t can wallow aft i g at ng a orrosiv poi son th foll w g s b tanc s (and amount) may b giv

Fo ids M lk w ter o milk of magn sia (1 Tbsp / 1 c p wat)

b F r alk lis M lk water y fruit j ce o i eg r

For p tie t 1 5 ye old give 1 to 2 p fo p tie t 5 y a d olde p to 1 q rt

2 I d e vom ting when on cor o ve sub t ces have b en swall w d G v milk o w t r (fo patie t 1 5 y s old 1 to 2 c p fo p t ent ver 5 ye rs up to 1 q art) I d c v m ting by pla g f ng or the bl nt e d of a poon t th b ck of th pat ent throat or by the u f a m tic (2 Tbsp s lt i a gl s of warm wat r) Whe tching d vomit g begin place p t t fa d wn with h ad low than h ps This pre e t vom tu from t r ng th l g d e i g f ther dam g

B Inhal d Pois ns C rry pat ent (d not l t him walk) t f esh ai mmedi t ly Open all doo and windows Loosen all tight lothing Apply a tif ial r p r tion if b thing h stopped or is ir egul r P v t chilli g (wrap pat nt in blank ts) Keep p ti nt as qui t as pos ible If p ti nt is con *vulsing k p him in bed in a semi d rk room avoid jar ing o* n i e D not giv alcoh l in any fo m

C Sk C t min t D ch skin with wat r (how r hos f t) Apply t e m f wate on skin while remo ing cloth i g Clean e skin th ro ghly with wat p dity w hing is m t important in r ducing xt nt of i j ry

D Eye Co t m ti H ld y t d pen w h ey with g tl t am of nn g w te *immediately* D lay of a f w cond g tly c es t nt of inj y Co t w shing til phy sicia a *Do not use ch mi als* they m y i as exte t of njury

E I je t d Poi n (S o pion and ake bit) Mak patient lie dow as soon possibl Do ot giv alc hol in any f m Apply tourniq t bov inj ti n sit (I b twe th bit and th h a t) Th pul in v ls b low th tou niq t sh ld ot di appe hould th to rniq t prod c a throbbing ns ti n T urniq t hould be loos ned f r 1 minut e y 15 minut s Apply ice pa k to the s t of th bit Carry p ti nt to physician o ho p t l *Do n t let him walk*

F Ch mi al B rn W sh with l g quantities of runni g water (pt in th c f b ns aused by pho ph) Cover imm di t ly with loo ly ppli d l an loth Avoid u e of ointment gr as s powde s and oth r dr gs in f st aid treat ment of b rn T t h ck by k eping pati nt fl t k ping him w m nd a ring him until arri al of phys ian

f Amphetamine sulfate 5 40 mg (1/12 2/3 gr) orally or I V
g Methamphetamine hydrochloride 2 5 15 mg (1/24 1/4 gr) orally or I V [For use of pentylenetetrazol (Metrazol®) and picrotoxin see page 537]
3 Hypostatic pneumonia (see page 122) *The principal measur s* include antibiotics and intratracheal aspiration p r n
C Central Nervous S st m Involvement
1 C N S excitement Use hypnotic or anticonvulsant drugs (see also pages 354 355) e g
a Amobarbital Sodium (Amytal®) 250 500 mg (3 3/4 7 1/2 g) as f sh 10% solution I M or I V
b P raldehyd (1) Oral 5 15 cc (1 4 dr) in cracked ice with milk juice or whisky (2) Rectal 5 30 cc (1 8 dr) in equ l q antity of vegetable or mine al oil (3) I M 5 10 cc i to buttock
c Calcium gluconate 10% 10 20 cc (2 1/2 5 dr) I V
2 C N S depression Use stimulant drugs (see above)
D Dehyd ation Use oral or parenteral fluids as tolerated and indicat d (s e page 19)
E P i See analges c and narcotic drugs on pages 32 and 33

A M.A RECOMMENDATIONS ON FIRST AID MEASURES FOR POISONING*

[Since prevention and helpful first aid measures are of great importance the following is provi d d for the physician s use in public education]

The aim of first aid meas r s is to help prev nt abso ption of the poison SPEED is essential First aid mess res m st be st ted at on e If possibl one person should begin treatme t while anothe calls a physi an When this is not possibl the na t re of the poi on will dete mine whether to call a physician fi st or begin fi st aid measures and then otify a physician Save the poison containe and materi l itself if any remains If th poi o is not known save a sample of the vomitus

Me su s To Be Taken Befo Arrival of Phy i ian
A Sw llow d Poi ons Many produ ts sed in nd around the hom although not l beled poison may be dangerous if taken nt rnally For example ome medic tions which are *beneficial when u ed co e tly may endange life if sed* im properly or in excessive amounts

In all ases *except tho e indicated below* REMOVE POISON FROM PATIENT S STOMACH IMMEDIATELY by in du ing vomiting This is the essence of th tre tment and is often a life aving proced re Preve t chilling by wrapping patient in blankets if n cessary Do not gi alcoh l i any form
1 DO NOT i duc vomiting if patie t is in com u conscio s or havi g conv lsio s if he has swallow d pet ole m prod ucts (i e keros n gasoline lighter fluid) o if he has

*Re omm ndation of th Committee on Toxicology Am ca Med cal Association Bernard E Conley Ph D S etary Modi fied and reproduced w th permission from _ 537 7 _

ALCOHOL METHYL (code No 010 331)

Methyl alcoh l a m co s m mb an i itant a d C N S d pre ant wh h has an aff ity fo th optic n e It is slowly ex cr t d f om the body and i m taboli ed g ving formald hyd a d fo mic cid a e d product wh h prod es a do is The M L D by ngestion is 30 60 cc (1 2 oz) Th p tient xperi n es head che epiga tr pa n dysp na ea a d on iting and may s f f r lo s f vision Exami tion r ve ls hyperemia cyano i ex c t m nt o dep ss o del r um coma and co vul ions

T tm t

1 L g stom h w ll with 1 or 2% odi m bicarb nate
2 Ch k s um CO_2
3 C mb t id is Gi s ff ent sodium b rb at o ally or alk l f V t mainta n alkali e u ne or serum CO_2 o tent of ov 20 mEq /L
4 K ep pat ent in shad d oom gi upport measu es p r n
5 A t d t Ethyl al oh l 100 proof 50% 3 20 cc very 2 4 hour for f days

ALKALIS (od No 010 32)

The st o g alk l s a mmon g di nt of ho s h ld cl ing omp unds a d m y d ntally b ing st d Th y rt thei eff ct o the k n d m s memb a b t n insta s of se lv m nt m y c s r ul tory f il and oll p The M L D fo th a ti powd (NaOH a d KOH) 15 Gm (1/2 o) f st ng mmo wat r 4 (1 d) R ve y ha follow d much l ge dos s how v Th e symptom of b ning pa th ope g t o t st l t a t us a and omiting and diffi ul ty n sw llow g and b thing Phy ic l x m n tion v als d tr ct on and edem of sk n a d mu o s m mb anes in nd ab t th mouth bloody omit and tool dysp and i ulat ry ll p e

T tm t (A id met a d la g if p f at on is a pos bility)

1 D l te in gar tr s) t neut al alk li 120 to 240 (4 8 o) f 0 5% hydr hl i a d m y be u ed
2 Gi f l of al d l (h lps eut ali t n by fo mation f s p) whit f 4 egg w ll m d w th w t r 1 2 Tb p g l tin 500 c (1 p t) f w t
3 W t h f d ma of l ynx do t che tomy f n ed d
4 S pp t v m s es a ne ess y
5 W h xt r l b with dil t vin ga or tru juic
6 Wa h y with w t r

ARSENIC

(A te de No 010-3114) (Ch onl ode No 011 3114)

A se i i f und in indust l ch mi als p stic des and a s n al m di ti

A y of th following may o u ea and vomit g ab d mi al mp dia h a marked thir t h king ns t n and dif ulty i yan is ma k d c eb al ympt ms c m

Measures to Pre ent Poisoni g Accide ts

(1) Ke p all dr gs poisono s substan es and household chemicals out of the reach of children
(2) Do not store no dible products on food shel es
(3) Keep all poisonous substan es in their original co taine s do not transfer to unlabeled conta ners
(4) When medicines ar discarded d st oy them D not th ow them wh re they might be e ched by child n or pets
(5) When giving flavo ed a d/or br ghtly colo ed med e t ch l dren *always* refer to t a medicine *never* s candy
(6) Do not take or give med c ne in the dark
(7) READ LABELS before using chemical p oduct

TREATMENT OF SPECIFIC POISONINGS (ALPHABETICAL ORDER)

ACIDS CORROSIVE (code No 010 32)

The st ong mineral acids exert prim r ly local cor sive eff t on the sk n or mu ous membranes In severe bu n rcul to y oll pse may result Th M L D is 4 cc (1 dr) of co ce trat d acid Symptoms in lude se ere p in in thro t and upper g st o- i testin l t a t marked th rst bloody vom t s diffic lty i swal low g breathing and pe king discoloration a d d struct on of kin and mucou memb nes in a d abo t mouth collapse and sho k

T e tm t (Avoid emet c o lavage if pe fo ti n is a po b lity)

1 Dilute a d mmedi tely with copious amounts of water milk or gg whites Do not waste time look ng f spe f c chemical a tidotes
2 L m wate magn s a or al min m gel o lly to n utralize a id Avoid ca bonat o b a bonat s ntern lly if p s sible s nce th fo m g and d stention of air dy weakened stom h w ll
3 Egg white be ten with 500 c m lk or wat as d m l e t
4 Ext rnal bu ns Wash with w te nd od um b c rb n te
5 Eye Wash well with 1% sodium b bo ate l t on
6 Ge e al s ppo tive c e a di t d(e p g 531)

ALCOHOL ETHYL

Ethyl al hol s a mucous memb an i tant nd a C N S depressa t The *M L D* i *100 200* (*3 7 o*) *f pu sic h l* whe i ge ted at on t me

T tme t (Avoid s d t s o ns t)

A A ut l to c t on (ode N 010 33)

1 Ca f l exami at o spe lly fo h d nj ry
2 La ge t m h w th l kew m w t onta ning 4 Gm (1 tsp) odi m b c bo ate o g v apomo ph ne 6 mg (1/10 gr) if alcohol has r cently been i g ted
3 St mul nt St ng black coff ally o r ct lly n k thamid inje ti n (Coram ne®) 25% 1 5 1 V
4 Resusc t t on for com to p t ent if d d Imm d at ause of d ath s s ally r pir tory f ilure

B D li i m Trem n (code N 003 332) (

2 Gastric lavag with 1 2000 p ta ium pe manganate B certain t emove all permangan te in f nal pir tion Thi s of doubtful value if perform d mo e than 6 hou s after in gesti n and may be dang ous CAUTION D nge of asp r ati n pne monia is great in stupo ou or comato e patients
3 P gation is of no value
4 Indwelling catheter Sav all urine fo toxi ologic st dies
5 Antibiot dr g P nicillin 300 000 to 500 000 units I M daily to less n dang of pne m ni
6 P teral fluid If diac failure i absent and enal fun tion is adequate giv 1 L physiologi al line and 1 2 L 5% d xtro e I V in w t r d ily to maintai rine output (1 1 5 L /24 h u s) U less fluid loss has b n excessi do n t gi e mo th 2 3 L f fluid du ing the first 24 h rs In e ent of ci c lat ry collap use plasm
7 C ntral nerv us sy tem stimulants (anal ptics or convulsant d g) Thes e n t true ba bit te ai t dote but ar utili ed to maintain patient s r p tions and reflex s Th ir pl c in th apy i uncertain They do ot ho ten th d ration f ffect of the drug and fter th i se th d p e sion m y be ev mo ev r They ar ften dang ou dr gs a d unless used carefully m y j opardiz the patient s hanc for r very S pe ior ty of th va o anal pti agents is o tro r i l so al ar m ntio d CAUTION Anal pti s should n t be cons d d to substit t f di ect phy iologi al t e tment of dep essed r spi tion a d c cul tion in b bit rat poi ning
   Pic toxin Inj tio U S P (0 3% o 3 mg /c) Administer 2 3 I V (o I M) at onc a d follow w th 3 c v y 20 30 mi t until t rn of fle small twit hing or body m veme t (ot o vuls ons) G m intenance d s ne e s ry to keep patient at thi lev l
   b P tylen t t az l Inject on U S P (M tra ol®) (10% o 100 mg /c) (Aft r M phy et l) Give 3 5 cc I V at o 15 c I V in 15 minute if p ti t is ar flexic 20 I V ev ry 30 min tes until fl turn and 2 5 I M p r n until full con c ous s is st ed Oth prepa tions Amphet mine eph drin m th m phetamine and stry hnine ha e be n ed s es fully alo e or n ombination but th i s pe ority o the above tre tme t m thods h not b en p ov d M tha tharimide (Megimid ®) (β β methyl thylgl t imid) has bee athe e thusiastically r ported s a ffective n w ba bit ate a tag nist in the t atm t of a t ba bi tur t poi ning E pe i nc in th co ntry s gg sts that the g t po sses o specif nal ptic prope ties but th is little viden of true b bitur te tago ism
8 The artifi i l kidney or pe itoneal di ly is i indicat d in v s when a ilable

BELLADONNA DERIVATIVES

(At pin code No 010 362) (Scopolamine cod No 010-379)

Th belladonna alkaloids a e parasymp thetic d pr ssants with variabl C N S ff ts M L D is 2 6 mg (1/30-1/10 gr) of at o ine t the usual lethal dos is n r 100 mg (1 1/2 g)

Tre tme t

1. *Emetic or* abundant gastric lavage with warm water
2. Follow with demulcent drink
3. Symptomatic relief of diarrhea (e g codeine)
4. Dimercaprol Injection U S P (BAL®) 10% solution in oil Give I M (Eagle J Ven Dis Inform 27 114 1946)
   a. *Severe poisoning 3 mg /Kg / dose (1 8 cc /80 Kg)*
      1st day 1 inject on eve y 4 hours day and night
      2nd day 1 injection every 4 hours day and night
      3rd day 1 injection every 6 hours for 4 doses
      4th day on 1 injection b i d for 10 days or until re covery is complete
   b. Mild poisoning 2 5 mg /Kg /dose (1 5 cc /60 Kg)
      1st day 1 injection e ery 4 hours for 4 doses
      2nd day 1 injection every 4 hours for 4 doses
      3rd day 1 injection b i d
      4th day on 1 injection once or twice a day for 10 days or until recovery is complete
   c. To ic reactions to BAL® These appea to be transi nt and over in 30 minutes They include nausea vom ting headache generaliz d aches and pains and burning sen sation about the head and face B rbit r tes have be *recommended for sev re side effects*

BARBITURATES (code No 010 3371)

Barbiturate are used for dati e hypnotic or anticonvulsant purpo es The ba biturates a e one of the most common m ans of both sui idal and a dental poison ng

Obtain d ta on dosage and time of ingestion from patient rela tives *friends or atte ding physi an when poss ble*

A. Mild Symptoms Drowsi ess m nt l confu ion headache ther may b e phoria o irrit bility
B. Mod rat or Ma ked Symptom Delirium stupor *shallow* and slow respir tions ci c latory ollapse cold clammy skin ya osis pulmonary edema dilated and non acting pupils hyporeflexia areflexia coma and finally de th

Treatm nt

A. Mild Symptoms Symptomatic and supporti nursing care St mulants sh uld be limit d to caffeine K ep patient under observatio *until dange has passed Place suicidal patients* under psychi tric care
B. Moderate or Mark d Symptoms Most of the e pati nts will survive even days of unco scio sness if the airway is kept open (sually req i es tracheotomy) and if artifici l respiration is m intained (sually with a tank espir tor) The patient should be hospitali ed and anti sho k me s res instit ted (see pag 27) Record the following at 15- to 30 minute interval until th danger *has passed* tempe ature p lse respiration and BP mental status or state of co s io sness skin color (cyano- s s or pallor) lung bases (pulmonary edem) *reflexes* (corn al pupillary gag *patellar) and sensation (response to pain)*
   1. *Airway* Aspirate mucus pull tongue forward and ins rt *oropharyngeal airway* Intr trache l or tr heostomy in t bation may be advisable

CARBON TETRACHLORIDE (code No 010 33411)

This ag nt is a v ry commo olve t and cl sing age t in ind try and the home It is a local irritant cardi c d p essa t an i gula C N S d p essant and a g n al protoplasmic poi on which has a ma k d eff ct on the liv nd k dneys It ent rs th body by ing stion a d inh lati n The M L D is 4 cc (I d) wh n ingested the M L D by inhal tion is unknown The ymptoms in l de heada he h c ough n s a vomiting di rh a bdom nal pain d ws es v al di turbances n ur t s and int ication Ea ly s gn a e t nd r liv jaundi e olig ria a d ur mia later eph os s a d irrh s s o c

Tr tme t

A Ac t Poi ng

1 Remov f om e po keep umb t and w m
2 Lavage copio ly with 1 2000 potas ium p mangan t
3 Sodium lfate 30 Gm (1 z) i w te at ce
4 T eat as pot t l ut hep t ti (se p ge 279) Ob erv f ol gu ia If it b m e m ife t tr t as a ute r n l fil e (se p g 303)
5 I t t t ppo tiv therapy

B Ch oni P is ing (Avo d alcohol)

1 R m v f om xpo e
2 Ca ef lly v l te h rt liv and k dney fun tion
3 T t a a pote t l ir h (s e p g 281)
4 Symptomat c and support m a u es

CYANIDES (code No 010 353)

Hyd o ya a d and th yanides a de th by inact v t n f th p r t y e zym p e t ng til z t o of oxyg n by th t s es Th M L D i 2 (1/2 d) by i g stio o inhal t n Th i a p d t of giddin s l ss f m s l power and tupo a omp i d by panti g spi at o and profound ll ps Th odor f b tt alm d i on th b th

T tm nt *Work r pidly for d ath occurs quickly*

A If I h l d (1) Pl i op n ai ke p e mb t po tion (2) Mai ta n tifi i l r spi tio man ally until a l of re s cit to (3) Amyl t ite (plac pea l in id ma k) by in hal t o fo 15 30 e ond e ery 2 5 min t (4) Sod m it it 10 15 c of 3% l tion o 50 of 1% sol tion I V t k g 2 4 minut fo je t on (5) Follow od um nit it w th 50 c of 25% ol ti n of d um thi s lf te sl wly I V (6) Re pe t N 4 d N 5 if symptoms ecur

B If I g t d G v amyl itrit as abov l vage tom h copi o ly w th 3% hydrog p roxide ol tio 10% odium thi ul f t sol t n 1 2000 pot ssium permanga t s l tion

C S ppo ti th r py

CHLOROPHENOTHANE (DDT) (code No 010 3)

DDT a C N S timul t whi h n e poisoning by in g sti nh l t o o d t o i ct Th M L D is prob bly abo t 20 C d) b t f w fatal ties have be repo t d When

The patient complains of dryness of mo th thirst difficulty in swallowing and blu ring of visi n The physical signs incl de di lated *pupils fl shed skin tachycardia fever delirium del sions* paralysis and st por

T eatm t (Avoid opiates)

1 Tincture of iodine 4 cc (1 dr) in 1000 cc (1 qt) of water
2 Uni ersal Antidote charcoal in water (See back cover)
3 Lavage well with 1 2000 pot ssium perma ganate sol tion
4 Sodium sulfate 30 Gm (1 oz) in water
5 Pentobarbital sodium 0 1 Gm (1½ gr) for excitement
6 Institute supportive measures

BROMIDES

(Acute code No 010 3217) (Chronic code No 011 3217)

Bromides are C N S depres ants frequ ntly found in m di inal preparatio s Acute poisoning is rare The symptoms incl d a o rexia constip tion drowsin ss apathy and hallucination The phys cal examinat on reveals de mat tis conjunct vitis foul breath f rred tong e sordes unequal and i regular p pils ataxia abnormal reflexes (often bi arre) toxic psychosis delirium and om

T atme t

1 I acute po soning lavage c piously with sali e to remo e un bsorbed bromides a d later to rem ve those e cr t d into the stom h Follow w th m gnesium ulf te 30 Gm (1 oz) n wat r for tharsis
2 Sodium chlo id 6 12 Gm (90 180 gr) daily in add tio to reg la d et ry i take 1000 c aline I V b d or the s me re tally o 1 2 Gm (15 30 g) ve y 4 hours or lly Treat unt l blood b om de le l is below 50 mg /100 c
3 Force flu ds to 4000 c d ily
4 U *continuo warm baths (95 96 F) or sedat ve cold p* ks a necessary

CARBON MONOXIDE (code No 010 352)

This g s is respo ble fo many d aths nd n r deaths resulting from the u of nv nted g s or oal b ning h ate s It i al o u ed for s icidal purpo s It combines with h moglob n to fo m relat ely stabl compo nd which cond ily ca se tiss e an x a Man festations are headach f int es giddine tinnit s vom t ing cherry red skin vertigo lo s of m mory fa nt ng collap e paralysis and u co sciousnes

Laboratory Data When boiled o wh n shaken with 1 to 2 v l um of sodium hydr x de blood remains ed wh l ormal blood b comes black o brow bl ck

Tre tme t

1 Remove p tient to fresh air k p warm l o clothi g nd m inta n at r st
2 Artificial r piration or resuscitatio 100% oxyge p r
3 Give 50 cc of 50% gl co e I V for ce b l ed ma
4 Institute uppo ti e mea e

T tment

1 Starch flour raw egg white o 1% sod thio ulf te in w ter
2 Follow with metic or remov by lav ge with 1% sodium thiosulfate sol tion Repeat until evide of iodin has dis appea ed f om gastric contents
3 Then giv demulcents e g milk o barl y w ter
4 Symptomatic and supportive meas e for systemic reacti n e g timulants o anticonvulsants

LEAD (code No 010 3112)

Lead may poison by ing tion or inhalation of its dust or f mes It h s local string nt act on a d a g nerali ed toxi effect The M L D is 10 Gm (150 g) of l d acetat Poisoning is mani fested by m tallic taste d y throat thi st abdominal coli vomit ing di r h a constip tion h dach l g cramps black stools (lead sulfide) olig i stupo onv lsions pal les a d oma In the ch onic f m th e i va iable i l ement of the C N S blood forming organs and gast ointestinal t act

T tme t

A Ac te Poisoni g *Do not use BAL®*

1 Lavage w th dilute magn ium sulfat o sodi m s lfat lu tion t pre ipitat in olubl lead ulf t
2 T eat symptomati lly Av id nar oti treat olic with lo al h at a tispasmodi and s datives
3 Edath mil Calcium Di odi m N N D (EDTA Vers n te®) fo ms a ol bl n oni ble le d complex that i excret d i th i a d has b n used suc fully in th t tm nt f le d po ning Gi o tin u ly I V (2% sol t on) or i te mitt ntly I M (20% solution onta ing 0 5% p o ain) n a tot l dos ge ng of 50-75 mg /Kg body weight per 24 ho r for a o r e f 5 7 day Th drug n phrot xic and sh uld ot g n r lly b give n d x ding 5 Gm pe 24 ho R pid nf and c iv lumes of dium containi g l tions m y gg t th al dy in e s d int a anial p e r es f eph lopathy espe i lly n hildr n Renal fun tion a d fluid and lect lyt eq ment m t b on id ed on an individual ba is

B Ch oni Poison g

1 R m p man tly from xp
2 Adeq at di t w th it min pplements
3 Co s s of EDTA m y be employ d especially wh n h ma tol gi compl c ti h v o curr d (s bo)
4 F phyl tic EDTA h uld n t be ed a a s bstit te f r p ed pr e tive and p tecti e me s s (xpo u e)

MERCURY (code No 010-3111)

M r u y pois ing o c rs by ing tion or inhalati n It is a g al pr t plasmi pois The M L D is bout 70 mg (1+ gr) of m ry bi hl ide Th manifest tion in l d m tallic tast livation thirst burning e sation in throat di olo ation and d m of oral tis es bdominal pain vomiti g bloody dia rhe and shock In th h onic f m there is weakn s ataxi int ntion tremo irritability dep es ion and m cl cramps

poisoning occurs from the material in solution the act al pois ning is usually due to the organic sol ent and not DDT *The manifesta tions* are tired and aching limbs nervous irritability mental sl g gishness muscle twitchings convulsions and coma

Treatme t (Avoid epinephrine may cause *ventricular fibrillation*)

1 Universal antidote at once if available (see back co er)
2 Lavage with large quantities of warm water
3 Sodium sulfate 30 Gm (1 oz) in water
4 Pentobarb tal sodium 0 1 Gm ($1\frac{1}{2}$ gr) orally Give 0 25 0 5 Gm Amobarbital Sodium N F (Amytal®) as fresh 10% solution slowly I V or I M for convulsions
5 Calcium gluconate 10% 10 cc I V fo con lsions
6 Supportive measures as necessary
7 High CHO high protein diet with added vit B to prote t liver

FLUORIDE POISONING (code No 010 3215)

Fluorides are found in agricult ral poisons and insect powders and are used in th aluminum industry Clinical f atures incl de nausea vomiting colicky abdominal pai diarrhea cyanosis C N S excitement and con ulsio s

Treatment

1 Lime water or other soluble alcium s lts orally in large quantities
2 Give emet c or use copious gastric lavage w th lime wate
3 Egg whites b ated with 500 cc (1 pt) milk or water
4 Stimulants (see page 531)
5 Calcium gl conate 10% 10 cc I V rep t if tetany occ rs
6 Give artificial respiration and combat shock

GASOLINE AND RELATED COMPOUNDS (code No 010 33x)

Gasoline poisoning may result from inhalation or ingestion *but* more se re symptoms result from inhalation because the C N S is m re quickly re ched by this te Acute manifestations are vomiting vertigo muscular incoo din tion weak and irregul r puls twitchings d *onvulsions In the chro ic form there is* also he dache drowsiness dim vi o cold a d numb hands w ak *ness* loss of memo y loss of weight tachycardia mental dullness or confusion so e n mo th de matoses a d secondary anemia

Treatm nt

1 Remove to f sh air
2 Lavage with s lad oil and/o l rge amounts of warm salin
3 Sodium sulfat 30 Gm (1 o) in wate foll wed by mineral oil 120 cc (4 oz)
4 Watch closely for 3 4 days f r vere symptoms or collap

IODINE (code No 010 3218)

Clinical features incl de charact risti stain of mouth and odor of br ath yellow or bl ish omitu pain and b rni g in ph rynx and esophagus *marked thirst* diar h (stools may be bloody) weakness dizziness syncope *or co vulsio s*

Mushroom Poisoning

	Aman ta m c i (fly aga)	Aman ta ph lloid s (dest oying ang l)
Pharm o- l g a tion	P symp th ti st mul tion by alkaloid musca ine	D r t to ti on l most all c lls e peci lly liv h a t kid y
O et sympto ns	S dd n l 2 h urs C nf o ex tem t thi t n ea a d vomit ing d rh wh zing s li at o sl w p l tremo s weak s ollap e nd e d ath	Del yed 12 24 h ur C nfus d p ess h dach onvul ions com na a vomiting bloody vom t a d tool p i ful larg ment f l j u d ce ol g ri p lmon ry dem
R t l of t atment	1 R mo l of GI t t by em is and lav ge fol low d by ath rsis 2 C te tio of m a alk l id by s of t pi ulf t 1 2 mg (1/60 1/30 gr) ub t at on d p t q 30 min p r 3 Sed t on w th b b t at. f e it m t 4 F e flu ds by o al nd p re t al te 5 T e t f h k	1 R n l of GI o ten by me and la ag f l low d by athar 2 Ant d te Tr t non sp lfi p rasymp th tic a t m ff t w th at p n lf t 1 2 mg (1/60 1/30 gr) b t at n a d q 30 mi p r n 3 R l ev p n w th a ot q r n 4 Prot t li with 4 5 l te of 5% de t e v y 24 ho r if al fun t on d qu te 5 T at f h k

OXALIC ACID (Cont d f m p vio s pag)

T tme t
1 G e at o l m l tate oth r lt 30 Gm (1 oz) in wat a gl s f l me w t r o la g m unts f milk to p pit te s lubl alc m o lat
2 L g w th 1 2000 pot m pe m g nate s lut
3 White of ggs b t m lk a demul nt
4 C l i m gl te o l t te 10 c of 10% l tio I V a d l m alt 1 2 Gm (15 30 gr) or lly q d
5 Inst t t s pp t v m s es

PESTICIDES

Common P st d d Th T tm t
A M t l
1 A l [Cal i m s nate le d a e te c pp a et t (P is g en)] D m p ol U S P (BAL®) th py (p g 536)
2 Le d alts [L ad r t] Ed thamil Cal i m D sodium N N D (V e te®) (S e p g 541) DO NOT USE BAL®
3 Coppe lts [Coppe lfat (bl vit iol ed in B rdea mixt)] Symptomatic and s pporti Sodi m

T eatment

1 Give white of eggs beaten with water or skimmed milk
2 Dimercaprol (BAL®) at once (see page 538)
3 Sodium sulfate 30 Gm (1 oz) in water
4 Fluids 1000 cc (1 qt) of saline I V at once (may add 1 Gm sodium thiosulfate) and repeat as ne essary
5 Watch urinary output Treat olig ria a d an ri if it oc u s (see page 303)
6 Symptomatic and supportive measures as ecessary
7 In chronic form remove from exposure may gi e 1 0 Gm (15 gr) of sodium thiosulfate in 10 cc (2½ dr) water I V every other day

MORPHINE (AND THE OPIATES) (cod No 010 370)

Morphine acts primarily on the C N S causing depre si n and narcosis The M L D is 65 mg (1 gr) in sus eptible individuals Manifestations headache nausea excitement depression pin point pupils slow respirations rap d and feeble pul shock and coma

T eatment

1 Nalorphine Hydrochloride U S P (Nallin ®) a n rcoti antagonist in doses of 5 10 mg I V as an antidote fo overdosage of morphine and its derivatives meperidine (Demerol®) and methadone If effective in rease in pulmonary ventilation is not hieved with the nitial dose 5 10 mg may be repeated every 15 minutes until respirations ret rn to normal and p tient responds to t muli
2 Mai tain adequate respi ation by use of artif cial respiration or preferably resuscitators with oxyge
3 Keep patient awake and wa m have him walk if necessa y or use ammonia inhalation and strong stimuli
4 Lavage stoma h well (pre ent aspirat o) with 1 2000 pot s sium p rmang nate at short inter al Mo phine is excreted *into the stom ch*
5 Sodium sulf te 30 Gm (1 oz) in wate a c thartic
6 Atropine sulf te 0 5 mg (1/120 g) ub ut if e pirati s re poo repe t as ne e ary

MUSHROOMS (code No 010 384)

Th Amanita ge us of m hro m ac nt fo almo t ll c s s of fungus poisoni g in the Unit d State Amanit mus aria p o ing of rapid onset e po ds spe ifi ally to atropine if treat d *promptly* recovery most oft n f llows Th del yed type of m sh room poisoning d e to Amanit ph lloid s A b un s ens and A verna has no spe f c a tidote and the progno s i s ally poo
Mu hroom po soning is mma zed in the t ble on pag *543*

OXALIC ACID (code No 010 3332)

Oxa ic acid a omponent of bleachi g powder is a pow rful lo al irritant wh ch p e ipitates oni ed calci m Th M L D is 4 Gm (1 dr) *Po soning* is m nif st d by b rning in mo th and *throat violent abdominal* pains bloody vomit s dysp a t em s oligu a and cir ul tory collapse

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65

T e tment
1 Keep pati nt quiet in a darkened room avoid stimulat on
2 At once 0 5 Gm (7½ gr) sodium amytal I V slowly in 10 20 cc (2½ 5 dr) of water If not available give drug orally in doses up to 5 times the hypnotic dose May r p at
3 Artificial respiration and oxygen duri g o vulsions
4 Lavage gently with 1 2000 potassium permanganate sol t on before symptoms appear
5 Inhalations of ether or chloroform to quiet patient

SNAKE (AND GILA MONSTER) BITES (code No 010 3814)

The venom of poi onous snakes and l a ds may be ne rotoxic or hemotoxic Neurotoxi s c use respiratory p alys s hemoto ns cause hemolysis and d str tion of endothelial lining of blood vessels The manifestations ar local p in thirst prof e p rspi tion na s a vomiting stimulat on followed by d pression l al redness swell ng extra asat n of blood and coll p

T e tme t (Avoid opiat s and al ohol)
1 Keep patient r mbent and quiet
2 Apply tou niquet (tight nough to block lymphat flow b t no v nous return) above bite releasing for 1 2 minute ve y 15 o 20 m nutes
3 C t deep c oss incis s at ite and pply tion
4 G ve sp f c ant v nin a oo possible (Foll w printed nstructio s)
5 Plenty of warm fl ids
6 B bitur te f sedat on s n d d
7 Inst t t suppo t ve m as re
8 Hospitalize and d t m ne blood type as s on as p ble giv transfu o s s n s ary Co t ot opin and o tic st o ds may b helpf l dj vant t e tme t (e p g s 423 8)

SPIDER BITES (od No 010 3815) AND
SCORPION STINGS (cod No 010 3815)
(Black Wid w Spider Bite cod No 010 3816)

Th to n of the l ss ven mous sp s of piders and sc p o s au s nly loc l p in redne nd swell g Th t of the m e ve omou spe ies c us s gene l d m cular pain con ul s na ea vomiting va ble C N S vol ement and ollapse

Tr atm t
1 Apply tourniq et c t ross nci ions and apply s tion
2 If ab o pti n ha oc red g v 10 f 10% calcium gl con t I V o I M R p at as ec s y
3 Giv spe if anti enin (None av il ble n U S A)
4 Keep pati nt recumb nt and q i t
5 Hot baths and 20 cc of 10% m gne ium sulf t I V fo e l ef of p (s e c tion on page 296)
6 Ad q ate s dati n I stit te s pportive m a u s
7 Hot compres es of s di m bi a bon te sol tio fo el ef of lo al pain if o syst mic invol m nt
8 Corticotrop n (ACTH) o th o ti one may be of om value n se er as (s e p ge 423)

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TABLES OF APPROXIMATE EQUIVALENTS

Weight Equ valents		Volume Equivalents		
Apothecary	Metric	Apoth c ry		M tr c
1/320 gr	0 2 mg	1 min	(♏)	0 06 cc
1/210 gr	0 3 mg	3 min	(♏)	0 18 cc
1/160 gr	0 4 mg	5 min	(♏)	0 3 cc
1/120 gr	0 5 mg	8 min	(♏)	0 5 c
1/100 gr	0 6 mg	10 min	(♏)	0 6 cc
1/60 gr	1 0 mg	12 min	( )	0 75 cc
1/30 gr	2 0 mg	15 min	(♏)	0 9 c
1/15 gr	4 0 mg	16 min	( )	1 0 cc
1/12 gr	5 4 mg	20 min	(♏)	1 2 cc
1/10 gr	6 5 mg	30 m n	( )	1 8
1/8 gr	8 0 mg	50 min	(♏)	3 0 cc
1/6 gr	11 0 mg	1 fl dr	(ʒ)	3 7 c
1/4 gr	16 0 mg	65 m n	(♏)	4 0 cc
1/3 gr	22 0 mg	80 min	( )	5 0 cc
3/8 gr	24 0 mg	2 fl dr	(ʒ)	7 5 c
1/2 gr	32 0 mg	2 2/3 fl d	(ʒ)	10 0 c
3/4 gr	0 0 mg	4 fl d	( )	15 0 cc
1 gr	65 0 mg	5 1/2 fl dr	(ʒ)	20 0 cc
1 1/2 gr	0 1 Gm	8 fl dr	(ʒ)	1 0 fl oz
2 gr	0 13 Gm	1 fl o	(ʒ)	30 0 cc
3 gr	0 2 Gm	1 2/3 fl oz	(ʒ)	50 0 cc
5 gr	0 32 Gm	2 fl o	(ʒ)	60 0 c
1/2 gr	0 5 Gm	3 3/8 fl o	(ʒ)	100 0 c
10 gr	0 65 Gm	4 fl oz	(ʒ)	120 0
15 gr	1 0 Gm	8 fl o	(ʒ)	240 0 cc
1 dr (ʒ)	4 0 Gm	16 fl o	(ʒ)	480 0 cc
1 oz (ʒ)	30 0 Gm	1 pt		480 0 cc

Household M asures	Apotheca y	Metri
1 tea poon	1 fl dr (ʒ)	4 c
1 table poon	½ fl o (ʒ)	15 c
1 teacup	4 fl oz (ʒ)	120 cc
1 glass (tumbl r)	8 fl oz (ʒ)	240 c
1 mes uring cup	8 fl oz ( )	240 cc
1 pint	16 fl oz (ʒ)	480 c

CENTIGRADE TO FAHRENHEIT TEMPERATURES

C	F	C	F	C	F
35	95	37 5	99 5	40	104
35 5	95 9	38	100 4	40 5	104 9
36	96 8	38 5	101 3	41	105 8
36 5	97 7	9	102 2	42	107 6
37	98 6	39 5	103 1	43	109 4

METRIC SYSTEM

W ight	1 000 micrograms (γ)	1 milligram (mg)
	1 000 milligrams (mg)	1 g am (Gm)
	1 000 grams (Gm)	1 kilog m (Kg)
Volume	1 000 c bic millimeters	1 mill lite (ml) or 1 cubic ntimeter (c)
	1,000 cubi ent met ( )	1 l t (L)

IDEAL WEIGHT FOR ADULTS AGES OF 25 AND OVER

(Cou t y f th M trop litan Lif In an C mpa y)

H igh (W th Sh)			Id l W ght in Pou d nd Kil gr m f MEN (For w ight without hoe lothi g bt t 5 6 pou d)					
			Sm ll F me		M d m F m		L g F am	
Ft	In	Cm	lb	Kg	lb	Kg	lb	Kg
	2	157 5	116 12	5 6 56 7	124 133	56 3 60 3	131 14	59 4 64 4
5	3	160 0	119 128	54 0 58 1	127 136	57 6 61 7	133 144	60 3 65 3
5	4	162 6	122 132	5 3 59 9	130 140	8 9 63 5	137 149	62 1 67 6
5	5	165 1	1 136	57 1 61 7	134 144	60 8 65 3	141 153	63 9 69 4
5	6	167 6	1 9 133	58 5 63 1	137 147	62 2 66 7	145 157	65 8 71 2
5	7	170 2	133 143	60 3 64 9	141 151	4 0 68 5	149 16	67 6 73 5
5	8	172 7	136 147	61 7 66 7	145 156	65 8 70 8	153 166	69 4 75 3
5	9	175 3	140 151	63 5 68 5	149 160	67 6 72 6	157 170	71 2 77 1
5	10	177 8	144 155	5 3 70 3	153 164	9 4 74 4	161 175	73 0 79 4
5	11	180 3	148 159	67,1 72 1	157 168	71 2 76 2	165 180	74 8 81 7
6	0	18 9	15 164	69 0 74 4	161 173	73 0 78 5	169 185	76 7 83 9
6	1	185 4	157 169	71 2 76 7	166 178	75 3 80 7	174 190	78 9 86 2
b		188 0	163 17	73 9 79 4	171 184	77 6 83 5	1 9 19	81 2 88 8
6	3	190 5	168 180	78 2 81 7	176 189	79 8 85 7	184 202	83 5 91 6

H ght (W h Sh)			Id l W igh in Pou d and Kilog am f WOMEN (F w ight w th t hoe lothing ub t 2 3 p d)					
			Sm ll F m		M i m F m		L g F m	
F	I	Cm	lb	Kg	lb	Kg	lb	Kg
5	0	152 4	105 113	47 6 51 3	112 120	50 8 54 4	119 129	54 0 58 5
5	1	154 9	107 115	48 5 52 2	114 122	51 7 5 3	121 131	54 9 59 4
5	2	157 5	110 118	49 9 53 5	117 125	53 1 56 7	124 135	56 3 61 2
5	3	1 0,0	113 121	51,3 54 9	1 0 128	54,4 58 1	127 138	57 6 6_,6
5	4	16 6	116 12	5 6 56 7	1 4 132	56 3 59 9	131 14	59 4 64 4
5	5	165 1	119 128	54 0 58 1	127 135	57 6 61	133 145	60 3 65 8
5	6	167 6	123 13	55 8 59 9	130 140	58 9 63 5	138 150	62 6 68 0
5	7	170 2	126 136	57 2 61 7	134 144	60 8 65 3	14 154	64 4 69 9
5	8	172 7	129 139	58 5 63 1	137 147	62 2 66 7	145 158	65 8 71 7
5	9	175 3	133 143	60 3 64 9	141 151	64 0 68 5	149 162	67 6 73 5
5	1	177 8	13 147	61 7 66 7	145 155	5 8 70 3	152 166	69 0 75 3
5	11	180 3	139 150	63 1 68 0	148 158	67 1 71 7	155 169	70 3 76 7
6	0	182 9	141 153	64 0 69 4	151 163	68 5 73 9	160 174	72 6 78 9

F g 18 2 pp im d l w gh an b i l t d by
bt cting 1 0 lb (0 5 Kg) f h y f g l than 25 y

AVERAGE HEIGHT AND WEIGHT FOR CHILDREN

Ag Y s	BOYS					GIRLS				
	H gh			W gh		H ght			W ght	
	F	In	Cm	Lb	Kg	F	I	Cm	Lb	Kg
B rth	1	8	45 7	7½	3 4	1	8	50 8	7½	3 4
1/2	2	2	66 0	17	7 7	2	2	66 0	16	7 2
1	2	5	73 6	21	9 5	2	5	73 6	20	9 1
2	2	9	83 8	26	11 8	2	9	83 8	25	11 3
3	3	0	91 4	31	14 0	3	0	91 4	30	13 6
4	3	3	99 0	34	15 4	3	3	99 0	33	15 0
5	3	6	106 6	39	17 7	3	5	104 1	38	17 2
6	3	9	114 2	46	20 9	3	8	111 7	45	20 4
7	3	11	119 3	5	33 1	3	11	119 3	49	2 2
8	4	2	127 0	57	5 8	4	2	127 0	56	25 4
9	4	4	13 0	63	8 6	4	4	132 0	62	28 1
10	4	6	137 1	69	3 3	4	6	137 1	69	31 3
11	4	8	142 2	77	34 9	4	8	142 2	77	34 9
12	4	10	147 3	83	37 7	4	10	47 3	86	39 0
3	5	0	152 4	92	41 7	5	0	2 4	98	45 5
14	5	2	157 5	107	48 5	5	2	157 5	107	48 5
15	5		62	16	52 6	5	3	160 0	115	52 2
16	5	6	167 6	128	58 0	5	4	162 6	118	53 5
17	5		7	134	6 8	5	4	16_6	118	53.5

W g g 5 d 17 i em ly ari bl